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CANADA
DEPARTMENT OF MINES
HON. LOUIS CODERRE, MINISTER; R. G. McCONNELL, B.A., ACTING DEPUTY MINISTER.

MINES BRANCH
EUGENE HAANEL, PH.D., DIRECTOR.

A GENERAL SUMMARY
OF THE
MINERAL PRODUCTION
OF
CANADA

During the Calendar Year

1913

JOHN McLEISH, B.A.

Chief of the Division of Mineral Resources and Statistics.

OTTAWA
GOVERNMENT PRINTING BUREAU
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ADVANCE CHAPTER OF THE ANNUAL REPORT ON THE MINERAL PRODUCTION OF CANADA, DURING THE CALENDAR YEAR, 1913.

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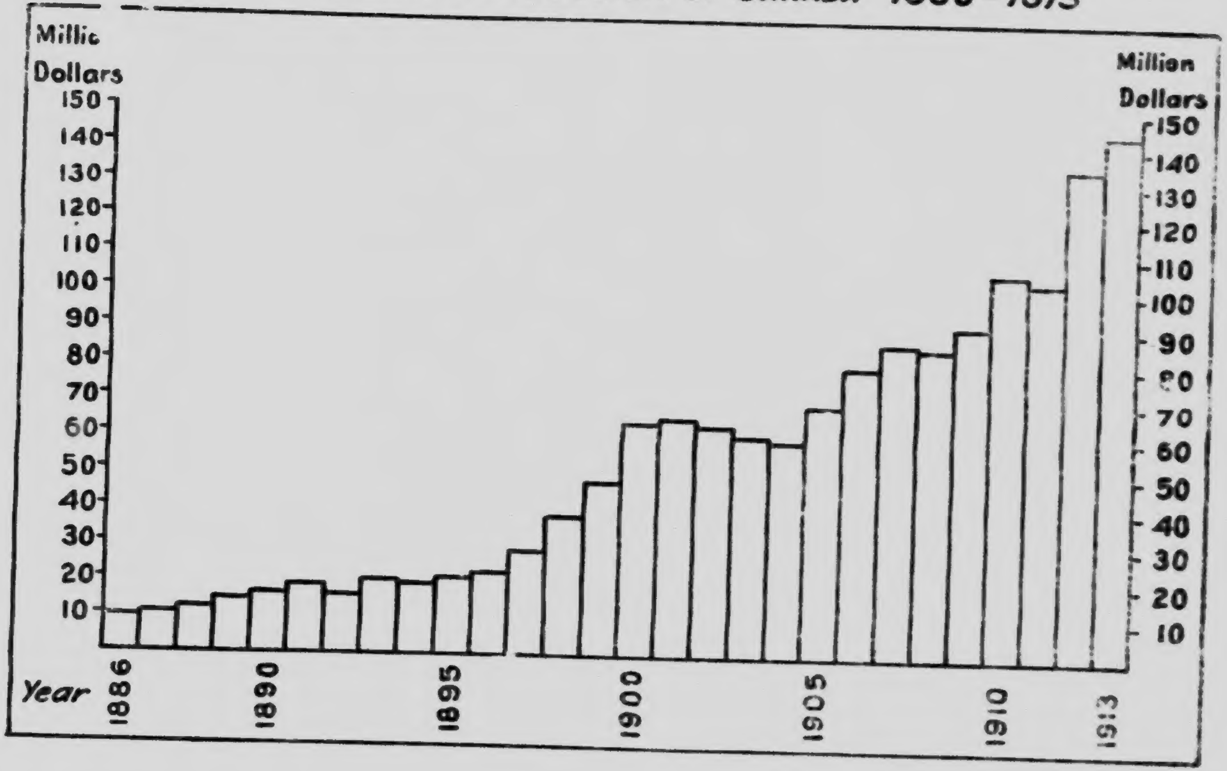

ANNUAL MINERAL PRODUCTION OF CANADA 1886-1913

THE

MINERAL PRODUCTION OF CANADA

During the Calendar Year

1913

General Summary.

Broad statements of the mineral production of the country in terms of a total valuation are of chief importance from the point of view of comparison.

The term 'mineral production' is so comprehensive that there is a wide divergence in methods, not only in the compilation of quantities of mineral products, but also in the adoption of basis of valuation. During the past four years the reports published by this Division have presented results obtained from two methods of compiling statistics of metal production, or the production of metalliferous ores. In the first method which has been the basis of the statistics here shown since 1886, the metallic production is stated in terms of the refined or recoverable metals produced and valued at the values of the refined metals. In the other method a total is compiled on the basis of the values of the ores produced or shipped from the mines in so far as these values are reported or are obtainable, a method which naturally gives a total aggregate value somewhat lower than that of the refined product. In both methods the non-metallic products are similarly compiled, viz.: on the general basis of the products and their values as used or marketed with certain important exceptions; coal for instance being included as coal, notwithstanding that a portion of the output may be made into and sold as coke by some of the colliery operators.

No matter what method may be used to arrive at a total, the result is certain to be subject to objection because of some difficulty or inconsistency so that as already stated the total value is useful chiefly as a means of comparing the results of one year with those of another and then only in a very general way.

The records of greatest importance in mineral statistics are those showing the quantities of products produced and shipped from mines and works, the home consumption, and the foreign trade, and in this report it has been endeavoured to make it as complete as possible.

Annual Mineral Production in Canada since 1886.

Year.	Value of production.	Value per capita.	Year.	Value of production.	Value per capita.
	$	$ cts.		$	$ cts.
1886	10,221,255	2 23	1900	64,420,877	12 04
1887	10,321,331	2 23	1901	65,797,911	12 16
1888	12,518,894	2 67	1902	63,231,836	11 36
1889	14,013,113	2 96	1903	61,740,513	10 83
1890	16,763,353	3 50	1904	60,082,771	10 27
1891	18,976,616	3 92	1905	69,078,999	11 49
1892	16,623,415	3 39	1906	79,286,697	12 81
1893	20,035,082	4 04	1907	86,865,202	13 75
1894	19,931,158	3 98	1908	85,557,101	13 16
1895	20,505,917	4 05	1909	91,831,441	13 70
1896	22,474,256	4 38	1910	106,823,623	14 93
1897	28,485,023	5 49	1911	103,220,994	14 42
1898	38,412,431	7 32	1912	135,048,296	18 27
1899	49,234,005	9 27	1913	145,634,812	18 77

The total value of the mineral production in Canada in 1913, compiled on the basis of applying to the metals their values when refined, was $145,634,812 or an average value per capita of $18.77. The total value compiled on the basis of mine shipments will be referred to under that heading. Notwithstanding the financial depression which became more pronounced as the year progressed, this production shows a very substantial increase over that of the previous year. The total value of the production in 1912 was $135,048,296 or an average of $18.27 per capita, compared with which the production in 1913 shows an increase of $10,586,516 or 7·8 per cent. The 1913 production was not only the largest recorded in aggregate amount, but also the highest per capita, and the increase over the previous year is particularly gratifying in view of the very great advance made in 1912 over all previous years.

The records of the annual mineral production in Canada since 1886 shown in the above table indicate the rapid growth which the mineral industry has made in Canada.

The total value of the production in 1886 was $10,221,255, or about $2.23 per capita In ten years the value had increased to $22,474,256, or $4.38 per capita, more than twice the total in 1886, and nearly twice the production per capita. The next ten years witnessed an increase to $79,286,697 in 1906, or $12.81 per capita, about 3½ times the production in 1896. Since 1906 the total production has shown an increase of over 80 per cent and an increase of nearly 50 per cent in production per capita.

The detailed comparative statement here presented shows the production of each important product during the past two years, the proportion which each contributes to the total production, and the increase or decrease as the case may be of the production, in 1913 as compared with that of 1912.

Comparative Statement of Mineral Production for Years 1912 and 1913.

Product.		1912.			1913.			Increase (+) or Decrease (−).		Increase (+) or Decrease (−).	
		Quantity.	Value (*a*)	Per cent of total.	Quantity.	Value (*a*)	Per cent of total.	Quantity.	%	Value.	%
Metallic.			$	%		$	%			$	
Cobalt oxide	Lbs.				660,079	525,028					
Nickel oxide	"	349,054	156,256		268,304	80,561	0·48	....		+ 375,611	....
Cobalt material, mixed cobalt and nickel oxides	"	1,285,280	163,988	0·24	....	90,266					
Copper (*b*)	"	77,832,127	12,718,548	9·42	76,976,925	11,753,606	8·07	− 855,202	1·10	− 964,942	7·58
Gold	Ozs.	611,885	12,648,794	9·37	802,973	16,598,923	11·40	+ 191,088	31·23	+ 3,950,129	31·23
Iron pig from Canadian ore (*c*)	Tons	36,355	450,886	0·33	73,508	996,429	0·68	+ 37,153	102·19	+ 545,543	120·99
Iron ore sold for export (*k*)	"	118,129	328,950	0·24	216,614	430,561	0·30	+ 98,485	83·37	+ 101,611	30·89
Lead (*d*)	Lbs.	35,763,476	1,597,554	1·18	37,662,703	1,754,705	1·21	+ 1,898,227	5·31	+ 157,151	9·84
Nickel (*e*)	"	44,841,542	13,452,463	9·96	49,676,772	14,903,032	10·23	+ 4,835,230	10·78	+ 1,450,569	10·78
Platinum	Crude ozs.	....	....	.....	18	489		+ 18	....	+ 489	....
Silver (*f*)	Ozs.	31,955,560	19,440,165	14·40	31,845,803	19,040,924	13·07	− 109,757	0·34	− 399,241	2·05
Zinc ore	Tons.	6,415	215,149	0·16	7,889	186,827	0·13	+ 1,474	22·97	− 28,322	13·16
Total		....	61,172,753	45·30	....	66,361,351	45·57	....	....	+ 5,188,598	8·48

Comparative Statement of Mineral Production for Years 1912 and 1913.—*Continued.*

Product.		1912.			1913.			Increase (+) or Decrease (−).		Increase (+) or Decrease (−).	
		Quantity.	Value. (*a*)	Per cent of total.	Quantity.	Value. (*a*)	Per cent of total.	Quantity.	%	Value.	%
Non-metallic.			$	%		$	%			$	
Actinolite	Tons	92	1,000		66	720		− 26	28·26	− 260	28·00
Arsenious oxide	"	2,045	89,262		1,692	101,463	0·07	− 353	17·26	+ 12,201	13·67
Asbestos	"	111,561	3,117,572	2·30	136,951	3,830,909	2·63	+ 25,390	22·76	+ 713,337	22·88
Asbestic	"	24,740	19,707		24,135	19,016		− 605	2·45	− 691	3·51
Chromite	"										
Coal	"	14,512,829	36,019,044	26·67	15,012,178	37,334,940	25·64	+ 499,349	3·44	+ 1,315,896	3·65
Corundum	"	1,960	239,091	0·18	1,177	137,036	0·09	− 783	39·95	− 102,055	42·68
Feldspar	"	13,733	30,916		16,790	60,795		+ 3,057	22·26	+ 29,879	96·65
Fluorspar	"	40	240		0	0		− 40		− 240	
Graphite	"	2,060	117,122		2,162	90,282	0·06	+ 102	4·95	− 26,840	22·92
" artificial	"	1,151			1,092			− 59	5·13		
Grindstones	"	4,412	52,090		4,837	51,325		+ 425	9·63	− 765	1·47
Gypsum	"	578,458	1,324,620	0·98	636,370	1,447,739	0·99	+ 57,912	10·01	+ 123,119	9·29
Magnesite	"	1,714	9,645		515	3,335		− 1,199	69·95	− 6,310	65·42
Manganese	"	75	1,875		0	0		− 75		− 1,875	
Mica	"		143,976	0·10		194,304	0·13			+ 50,328	34·96
Mineral pigments—											
Barytes	Tons	464	5,104		641	6,410		+ 177	38·15	+ 1,306	25·59
Ochres	"	7,654	32,410		5,987	41,774		− 1,667	21·78	+ 9,364	28·89
Mineral water			172,465	0·13		173,677	0·12			+ 1,212	0·70
Natural gas (*g*)	M. Ft	15,286,803	2,362,700	1·75	20,477,838	3,309,381	2·27	+ 5,191,035	33·96	+ 946,681	40·07
Peat	Tons	700	2,900		2,600	10,100		+ 1,900	271·43	+ 7,200	248·28
Petroleum (*h*)	Bls.	243,336	345,050	0·26	228,080	406,439	0·28	− 15,256	6·27	+ 61,389	17·79
Phosphate	Tons	164	1,640		385	3,643		+ 221	134·76	+ 2,003	122·13
Pyrites	"	81,526	314,085	0·23	158,566	521,181	0·36	+ 77,040	94·49	+ 207,096	65·94
Quartz	"	100,242	195,216	0·14	78,261	169,842	0·12	− 21,981	21·93	− 25,374	13·00
Salt	"	95,053	459,582	0·34	100,791	491,280	0·38	+ 5,738	6·04	+ 31,698	6·90
Talc	"	8,270	23,132		12,250	45,980		+ 3,980	48·13	+ 22,848	98·77
Tripolite	"	38	230		620	12,138		+ 582		+ 11,908	
Total			45,080,674	33·38		48,463,709				+ 3,383,035	7·50

Structural Materials and Clay Products.			$	%		$	%			$	
Cement, Portland	Bls.	7,132,732	9,106,556	6·74	8,658,805	11,019,418	7·57	+ 1,526,073	21·40	+ 1,912,862	21·05
Clay products—											
Brick, common	No.	769,191,532	7,010,375	5·19	668,426,675	5,917,373	4·07	−100,764,857	13·10	− 1,093 002	15·59
Brick, pressed	"	125,180,422	1,609,854	1·19	116,802,053	1,458,733	1·00	− 9,378,369	7·49	− 151,121	9·39
Brick, paving	"	4,579,500	85,989		4,208,295	75,669		− 371,205	8·10	− 10,320	12·00
Brick, moulded and ornamental		371,356	8,595		875,355	15,423		+ 503,999	135·71	+ 6,828	79·44
Fireclay, and fireclay products			125,585			142,738	0·10			+ 17,153	13·66
Fireproofing and architectural terra-cotta			448,853	0·33		461,387	0·32			+ 12,534	2·79
Kaolin	Tons	20	160		500	5,000		+ 480		+ 4,840	
Pottery			43,955			53,533				+ 9,578	22·30
Sewer-pipe			884,641	0·65		1,035,906	0·66			+ 151,265	17·10
Tile, drain	No.		357,862	0·26		338,552	0·24			− 19,310	5·40
Lime	Bus.	8,475,839	1,844,849	1·37	7,558,484	1,609,398	1·11	− 917,355	10·82	− 235,451	12·76
Sand lime brick	No.	96,448,402	1,020,386	0·76	92,586,676	906,665	0·63	− 3,861,726	4·00	− 113,721	11·14
Sand and gravel (*n*)			1,512,099	1·12		2,258 874	1·56			+ 746,775	49·39
Slate	Squares	1 894	8.939		1,432	6,444		− 462	24·39	− 2,495	27·91
Stone—											
Granite			1,373,119	1·02		1,653,791	1·14			+ 280,672	20·44
Limestone			2,762,936	2·04		3,204,091	2·20			+ 441,155	15·96
Marble			260,764	0·19		[illegible]19,975	0·71			− 10,789	4·14
Sandstone			329,352	0·24		396,782	0·28			+ 67,430	20·47
Total			28,794,869	21·32		30,809,752	21·15			+ 2,014,883	7·00
Grand total			135,048,296	100·00		145,634,812	100·00			+10,586,516	7·84

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*Short tons throughout. (*a*) The metals copper, lead, nickel, and silver are for statistical and comparative purposes valued at the final average value of the refined metal. Pig-iron, zinc ore, and cobalt oxides are valued at the furnace or spot, and non-metallic products at the mine or point of shipment. (*b*) Copper content of smelter products and estimated recoveries from ores exported, at 16·341 cents per pound, in 1912; and 15·269 cents per pound in 1913. (*c*) The total production of pig-iron in Canada in 1912 was 1,014,587 tons valued at $14,550,999, of which it is estimated 978,232 tons valued at $14,100,113 should be credited to imported ores; in 1913 the total production was 1,128,967 tons valued at $16,540,012, of which 1,055,459 tons valued at $15,543,583 are credited to imported ores. (*d*) Refined lead and lead contained in base bullion exported at 4·467 cents per pound in 1912, and 4·659 cents in 1913, the average prices in Montreal. (*e*) Nickel content of matte produced valued at 30 cents in 1912 and 1913. (Increasing quantities of nickel-copper matte are now being used in making monel metal which is sold at a price much below that of refined nickel). The value of the nickel contained in matte, as returned by the operators, was about 10 cents per pound for both years. (*f*) Estimated recoverable silver at 60·835 cents per ounce in 1912, and at 59·791 cents in 1913. (*g*) Gross returns for sale of gas. (*h*) Quantity on which bounty was paid and valued at $1·418 per barrel in 1912, and at $1·782 in 1913. (*k*) In 1912 and 1913 figures as reported by the producers, which differ slightly from those of the Trade and Navigation reports. (*n*) Partial record only of production.

Of the production in 1913, metallic products were valued at $66,361,351, or 45·5 per cent of the total. Non-metallic products, excluding structural materials, were valued at $48,463,709, or 33·3 per cent of the total, and structural materials, $30,809,752, or 21·2 per cent. Compared with 1912 the metallic products showed an increase of nearly 8·5 per cent; non-metallic products an increase of 7·5 per cent, and structural materials an increase of 7 per cent. Amongst metallic products the chief increases were in gold, iron, lead, and nickel, and the principal decreases in copper and silver. Amongst the non-metallic products, the chief increases were in asbestos, coal, feldspar, gypsum, mica, natural gas, pyrites, salt, and talc, and the decreases, in corundum and quartz. In the case of petroleum there was a decrease in the number of barrels produced, but on account of the higher price obtained, an increase in total value.

The structural materials showed increases in the production of cement, stone, and sand and gravel, and decreases in the aggregate production of clay products, and in lime, sand-lime brick, and slate.

Coal still continues as the most important mineral product in Canada, both in point of tonnage and value. The continuance during 1913 of the labour strike at the mines of the Canadian Collieries (Dunsmuir) Ltd., and its extension to the other collieries on Vancouver island, seriously restricted the output, nevertheless this product contributed 2·56 per cent of the total, as against 26·6 per cent in 1912. The metals come next in importance with silver contributing 13·07 per cent of the grand total; gold 11·4 per cent; nickel 10·23 per cent, and copper 8·07 per cent. With the increase in output from the Porcupine district, gold has advanced from fifth to third place in order of value. From 1898 to 1903, or during the period of maximum gold production in the Yukon gold, was in point of value the most important mineral product. The total value of the metals in 1913 was somewhat smaller than it might otherwise have been because of the slightly lower average prices obtained.

With the exception of lead and nickel, all the metals showed a falling off in average price. Copper dropped from 16·341 cents per pound in 1912, to 15·269 cents, a decrease of 1·072 cents. Silver dropped from 60·835 cents per ounce, to 59·791 cents per ounce on the New York market, a loss of 1·044 cents. The average price of spelter in New York decreased from 6·943 cents per pound, to 5·648 cents in 1913, and tin from 46·096 cents per pound in 1912, to 44·252 cents in 1913. The average price of lead in Montreal increased from 4·467 cents per pound in 1912 to 4·659 cents in 1913. There was also an increase in the average price of lead in London. The New York price, however, fell off from 4·471 cents in 1912 to 4·370 cents in 1913.

Metal Prices.

—	1908.	1909.	1910.	1911.	1912.	1913.
	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.
Copper, New York	13·208	12·982	12·738	12·376	16·341	15·269
Lead "	4·200	4·273	4·446	4·420	4·471	4·370
" London	2·935	2·839	2·807	3·035	3·895	4·072
" Montreal*	3·364	3·268	3·246	3·480	4·467	4·659
Nickel, New York	43·000	40·000	40·000	40·000	40·000	40·000
Silver "	52·864	51·503	53·486	53·304	60·835	59·791
Spelter "	4·720	5·503	5·520	5·758	6·943	5·648
Tin "	29·465	29·725	34·123	42·281	46·096	44·252

*Quotations furnished by Messrs. Thomas Robertson & Company, Montreal, Que.

The production of pig-iron included in the general table includes only that proportion of the output of Canadian blast furnaces credited to Canadian ores. There is an important production of pig-iron from imported ores (shown in the footnotes of the general table, and in the chapter on iron and steel) and the total value thereof in 1913 was exceeded only by the production of coal, copper, and gold. There is also a large production of aluminium from imported ores, for which no value is included in the general table of production.

The production of cement in 1913 constituted 7·57 per cent of the total, clay products 6·4 per cent; stone 4·33 per cent; asbestos 2·6 per cent; and natural gas 2·27 per cent.

EXPORTS AND IMPORTS.

A very large portion of the mineral production of Canada is exported for consumption or refining outside of Canada. On the other hand considerable quantities of mine products, chiefly those which have been refined or subjected to partial treatment, or in the form of manufactured goods ready for consumption, are imported.

The total value of the exports of products of the mine, including direct mine products and manufactures thereof, in 1913 was $79,803,874, as compared with $68,590,225 in 1912. This value includes for 1913 mine products to the value of $59,073,167, and manufactures valued at $20,730,707, as against mine products valued at $54,349,640, and manufactures valued at $14,241,585 in 1912. Practically the whole of the Canadian production of copper, nickel, and silver is exported, also a very large proportion of the production of gold, asbsetos, and mica. There are as well considerable exports of coal. These products alone contribute about 95 per cent of the value of the mine products exported. Manufactured products exported consist chiefly of iron and steel goods, agricultural implements, aluminium, calcium carbide, acetate of lime, and coke.

The United States is the chief destination of Canada's mine exports, about 77 per cent having been exported to that country during the fiscal year 1912–1913, and about 21 per cent to Great Britain.

A great variety of mineral products, chiefly in a manufactured or semi-manufactured condition, are annually imported into Canada, and these imports have been increasing with much greater rapidity than has Canada's domestic mineral production. The total value of such imports during the calendar year 1913, was $252,806,046, as compared with imports valued at $238,212,835 in 1912; $181,773,708 in 1911, and $147,305,012 in 1910. Of the total imports in 1913, over $58,000,000 was made up of the cruder forms of mineral products such as coal, diamonds unset and bort, iron ore, asphaltum, ores of metals, alumina, sand and gravel, etc., as against $50,000,000 for similar products in 1912. The imports of iron and steel in 1913 included in this table, were valued at $134,778,658, as against $128,321,146 in 1912. Imports of the metals, aluminium, antimony, copper, gold, silver, lead, platinum, tin, and zinc, and manufactures thereof, and metallic alloys, reached a total value of nearly $26,000,000, as compared with a value of over $27,000,000 in 1912; petroleum and products of, $13,238,429, as against $11,858,533 in 1912; clays and clay products $6,760,752, as against $6,592,540 in 1912.

Over 50 per cent of the total imports were in iron and steel products, and the principal increases in imports in 1913 were in coal, iron and steel, and in petroleum and petroleum products.

EXPORTS.

Exports of the Products of the Mine and of Manufactures of Mine Products—Calendar Years 1912 and 1913.

—		1912.		1913.	
		Quantity.	Value.	Quantity.	Value.
Mine Products.			$		$
Arsenic	Lbs.	3,847,906	101,310	2,606,767	107,094
Asbestos	Tons	88,008	2,349,353	103,812	2,848,047
Asbestos sand	"	....	....	24,766	138,737
Barytes	Cwt.	68	114	....	....
Coal	Tons	2,127,133	5,821,593	1,562,020	3,961,351
Copper, fine in ore, etc	Lbs.	76,542,643	8,800,267	81,879,080	9,479,480
" black or coarse and in pigs	"	1,945,921	236,212	771,280	123,431
Feldspar	Tons	12,779	44,114	15,966	62,767
Gold	$	....	10,014,654	....	12,770,838
Gypsum	Tons	364,643	423,208	417,302	504,383
Lead, in ore, etc	Lbs.	299,240	8,193	329,960	9,136
Mica	"	895,338	334,054	817,152	240,775
Mineral pigments	"	6,032,640	34,513	3,912,400	18,931
Mineral water	Gals.	9,690	4,710	3,640	526
Nickel, in ore, etc	Lbs.	44,221,860	4,661,758	49,459,017	5,195,550
Oil, mineral, crude, etc	Gals.	18,500	3,964	3,650	379
Oil, refined	"	36,945	6,147	24,273	3,188
Ores—					
Corundum	Tons	1,928	205,819	1,077	121,741
Iron	"	118,129	382,005	126,124	426,681
Manganese	"	10	300	8	303
Other ores	"	15,573	530,270	10,835	658,808
Platinum	Ozs.	92	3,821	158	7,429
Plumbago	Cwt.	33,074	70,763	32,842	85,368
Pyrites	Tons	5,938	11,935	46,066	211,640
Salt	Cwt.	2,892	3,723	4,609	3,047
Sand and gravel	Tons	660,090	459,952	644,633	440,956
Silver	Ozs.	34,911,922	19,494,416	37,371,569	21,441,220
Stone, building	Tons	108,516	28,795	191,981	82,646
" ornamental	"	2,339	1,826	1,942	687
" crushed	"	....	....	4,814	3,126
Other products of the mine		....	311,851	....	124,392
Total mine products		....	54,349,640	....	59,073,167

EXPORTS.

Exports of the Products of the Mine and of Manufactures of Mine Products—Calendar Years 1912 and 1913.—*Continued.*

		1912.		1913.	
		Quantity.	Value.	Quantity.	Value.
MANUFACTURES.			$		$
Acetate of lime	Lbs.	14,691,678	312,262	14,902,990	322,069
Acid, sulphuric	"	....	....	2,494,740	15,295
Agricultural implements—					
Cultivators	No.	5,059	100,043	7,795	201,758
Drills	"	....	....	10,364	634,121
Harrows	"	4,734	100,579	7,300	127,482
Harvesters	"	15,341	1,634,208	23,194	2,439,319
Hay rakes	"	6,646	199,092	9,846	247,445
Mowing machines	"	16,213	562,502	24,044	847,253
Parts of	$	....	577,895	....	915,142
Ploughs	No.	13,580	412,460	15,450	465,505
Reapers	"	3,243	1[illegible],156	5.604	317,716
Seeders	"	70	[illegible],040	....	....
Threshing machines	"	761	214,499	1,928	712,270
All other	"	....	1,964,071	....	503,235
Aluminium, in bars	Cwt.	182,857	2,002,363	130,150	1,762,214
" manufactures of	$	....	10,898	....	8,203
Asbestos, manufactures of	"	....	....	....	73,446
Bricks	M	694	8,493	977	8,579
Calcium carbide	Lbs.	7,549,137	230,503	5,163,577	153,702
Cement	$	....	2,436	....	1,739
Clay, manufactures of	"	....	256	....	27,201
Coke	Tons	57,744	252,763	68,235	308,410
Earthenware, and all manufactures of		....	10,001	....	16,553
Fertilizers	$		....	....	2,439,923
Grindstones, manufactured	$		26,535	....	54,867
Gypsum and plaster ground	$		6,495	....	5,795
Iron and steel:—					
Castings, N.E.S.	$		27,113	....	61,362
Gas buoys and parts of	$		83,583	....	35,462
Hardware, tools, etc	$		91,731	....	101,990
" N.E.S.	$	....	48,474	....	70,767
Machinery (Linotype machines)	$	....	6,555	....	9,631
" N.E.S.	$	....	474,996	....	435,333
Pig-iron	Tons	6,976	310,702	6,326	351,646
Scrap iron and steel	Cwt.	332,641	145,250	911,111	483,813
Sewing machines	No.	24,158	259,617	8,122	114,438
Steel and manufactures of	$	....	785,731	....	1,051,004
Stoves	No.	1,390	21,110	1,371	23,858
Typewriters	"	4,025	277,583	3,048	201,763
Vehicles—					
Automobiles	"	3,028	2,013,784	5,997	3,395,382
" parts of	$	....	105,330	....	210,623
Bicycles	No.	101	9,058	90	8,058
" parts of	$	....	54,322	....	16,901
Washing machines	"	....	....	....	15,872
Lime	$		35,097	....	29,234
Metals:—					
Brass, old and scrap	Cwt.		....	32,144	293,572
Copper "	"		....	24,[illegible]72	324,903
Metallic shingles, etc	$	....	....	....	119,673
Metals, n.o.p.	$	....	261,752	....	399,792
Mineral and aerated waters (in bottles)	$	....	....	....	970
Naphtha and gasoline	Gals.	25,791	4,261	17,875	4,284
Oil, n.o.p.	"	397,039	119,686	634,861	171,663
Phosphorus	Lbs.	543,620	66,806	534,340	73,395
Plumbago, manufactures of		....	58,920	....	24,284
Stone, building		....	163	....	....
" ornamental		....	2,458	....	7,381
Tar		....	76,261	....	30,628
Tin, manufactures of		....	69,692	....	53,783
Total manufactures		....	14,240,585	....	20,730,707
Grand total		....	68,590,225	....	79,803,874

EXPORTS.

Showing Destination of Mine Products during the Fiscal Years, 1910-11, 1911-12, and 1912-13.

Destination.	1910-11. Value.	1911-12. Value.	1912-13. Value.
British Empire.	$	$	$
United Kingdom	6,726,015	5,555,599	12,066,622
Australia and Tasmania	161,017	178,260	73,283
Bermuda	66,525	62,494	5,315
British South Africa	....	10,460	33,415
" Guiana	....	1,492	37,963
" India	2,768	....	....
" W. Indies	11,904	13,635	15,383
Hong Kong	376,553	434,202	491,121
Newfoundland and Labrador	580,632	618,766	498,989
New Zealand	2,309	1,050	948
Total British Empire	7,927,723	6,875,958	13,223,059
Other Countries,			
Alaska	392,715	305,086	327,325
Argentina	1,383	24,313	66,315
Austria-Hungary	720	1,410	32,474
Belgium	220,244	101,66	141,924
Brazil	....	....	54,760
Chili	....	19,669	....
China	301,870	103,904	511,155
Costa Rica	2,376	....	....
Cuba	10,161	21,590	8,852
Denmark	....	448	877
Dutch Guiana	48	....	....
France	116,326	74,487	114,370
French Africa	....	....	2,127
Germany	239,596	248,925	172,,966
Hayti	....	....	843
Holland	21,609	5,260	27,529
Italy	8,000	4,358	7,430
Japan	85,247	58,773	54,976
Mexico	302,055	159,345	69,946
Miquelon and St. Pierre	24,941	30,205	47,093
Peru	....	3,682	....
Philippines	....	2,824	....
Portuguese Africa	....	20,340	....
Roumania	....	....	4,791
San Domingo	1,000	1,000	....
Spain	....	1,471	....
Switzerland	300	159	....
United States	33,129,505	33,259,580	42,541,751
Uruguay	1,742	,68	31,983
Total other countries	34,859,838	34,448,558	44,219,487
Grand total	42,787,561	41,324,516	57,442,546

IMPORTS.

Imports of Products of the Mine and Manufactures of Mine Products—Calendar Years 1912 and 1913.

Products.	1912 Value.	1913 Value.
	$	$
Alumina	448,061	614,713
Alum, alum cake, and chloralum	151,850	1[illegible]3,613
Aluminium and manufactures	533,705	745,694
Antimony regulus	60,456	49,408
Antimony salts	7,197	2,421
Arsenic, oxide and sulphide of	21,153	18,820
Asbestos	461,449	520,082
Asphaltum	863,456	905,[illegible]29
Bells and gongs	110,015	130,351
Bismuth	6,378	4,940
Blanc fixe and satin white	34,794	38,043
Blast furnace slag	110,148	71,114
Borax	112,022	104,787
Brick and tile	2,255,569	1,928,735
Brick, fire, of a kind not made in Canada, and n.o.p	953,621	1,192,857
Bromine and bromides	145	385
Burrstones	1,109	1,784
Cement, Portland and manufactures	1,979,227	427,032
Chalk, Cornwall stone, feldspar, fluorspar, etc	167,090	164,879
Clays	288,394	324,[illegible]30
Coal, anthracite, bituminous, slack, and run of mine	39,478,037	47,949,119
Coal tar and coal pitch	217,861	225,765
Coke	1,702,856	2,180,830
Coke, ground for electric batteries	4,792	9,942
Copper and manufactures of	7,047,356	7,414,610
Cryolite	56,591	33,487
Crucibles, clay or plumbago	82,324	73,971
Chloride of lime	113,346	115,614
Cyanides of potassium, sodium, cyanogen, or cpd of bromine	143,978	217,[illegible]
Diamonds, unset, and bort	3,623,424	3,223,711
Earthenware	3,094,956	3,314,870
Earths, crude	13,007	9,527
Electric carbons	58,951	98,944
Emery	177,187	184,649
Fertilizers, compound or manufactured	580,351	505,904
Flint, quartz, silex, etc	50,571	74,529
Foundry facings	23,536	24,226
Fullers earth	10,390	13,190
Fossils	3,994	3,237
Gannister	2,151	1,776
Gold and silver and manufactures of	3,618,701	2,736,517
Graphite and manufactures of	73,160	82,262
Grindstones	112,020	145,247
Gypsum and plaster of Paris	268,103	188,252
Hydrofluosilicic acid	....	46,517
*Iron and steel—Total, 1912, $128,321,146; 1913, $134,778,658—		
Agricultural implements	4,358,074	4,138,893
Bar iron or steel, rolled, whether in coils, bundles, rods or bars	3,561,709	4,381,341
Castings, iron or steel, n.o.p	1,592,930	1,644,991
Cutlery	1,337,782	1,322,054
Engines, locomotive and others	5,293,016	5,714,765
Iron, pig	3,512,969	3,247,405

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*These statistics of imports of iron and steel have been compiled from the Reports of Trade and Commerce and evidently do not include as many items as the record which has been compiled directly from the Reports of Trade and Navigation for the chapter on Iron and Steel. According to the latter compilation the imports of iron and steel for the twelve months ending December, 1913, were valued a $141,272,357, and during the twelve months ending March 31, 1913, were valued at $144,100,949.

IMPORTS.

Imports of Products of the Mine and Manufactures of Mine Products Calendar Years 1912 and 1913—*Continued.*

Products.	1912 Value.	1913 Value.
Iron and steel—*Con.*	$	$
Iron or steel blooms, billets, puddled bars and loops, ingots, cogged ingots, slabs, or other forms, n.o.p., etc.	1,558,393	1,212,314
Iron or steel rolled, angles, tees, beams, channels, girders, etc	6,636,978	10,292,516
" " rolled plates, not less than 30" wide or ¼" thick	1,750,175	2,744,321
" " rolled plate, universal mill or rolled edge bridge plates	1,158,135	1,812,399
" " skelp, sheared or rolled in grooves, etc	2,648,010	2,972,094
" " sheets, flat galvanised, Canada plates, etc	1,539,645	2,654,421
Machines and machinery	37,826,662	33,099,458
Steel rails	3,761,108	4,886,117
Tubing	4,044 377	4,265,875
Tools and implements	1,[illegible] 799	1,448,166
Wire	4,[illegible]4	4,711,570
All other iron and steel and manufactures of	41,457,673	44,229,958
Iron ore	(*b*)3,932,074	3,877,824
Iron sand	13,347	10,[illegible]68
Kainite	231	1,170
Lead and manufactures; litharge	1,806,221	1,215,433
Lime	207,481	238,271
Lithographic stone	7,081	7,152
Manganese, oxide of	27.707	46,990
Magnesia	29,641	12,226
Meerschaum	[illegible]	111
Mercury or quicksilver, cinnabar	72,171	109,493
Metallic alloys:—		
Babbitt metal	49,387	41,112
Brass and manufactures of	4,942,531	4,667,768
Britannia metal	53,585	43,417
German silver, nickel, and nickel silver	172,344	249,192
Type metal	1,195	1,981
Mineral and bituminous substances	191,241	198,519
Mineral water, including aerated water	273,698	257,153
Nickel anodes	23,125	8,512
Ochres, etc	69,621	283,554
Ores of metals, n.o.p., cobalt ore	927,428	894,989
Paraffin wax	85,491	72,351
Paraffin candles	34,029	37,546
Petroleum and products of	11,858,533	13,238,429
Phosphate (fertilizer)	24,586	16,070
Platinum and manufactures of	232,163	145,674
Potash and manufactures of	324,964	414,165
Precious stones	522,298	360,473
Pumice	21,310	17,861
Salt	485,950	565,283
Saltpetre	100,500	81,797
Sand and gravel	445,781	440,343
Slate and manufactures of	200,643	235,474
Sand paper	189,782	171,516
Soda products: barilla, bichromate, caustic, salt, and salt cake	896,070	998,993
Stone and manufactures of (including marble)	1,467,143	1,640,849
Soda, nitrate of	1,537,379	1,645,320
Sulphate of iron (copperas)	5,178	5,036
Sulphur and phosphorus	810,702	638,970
Sulphuric acid	35,325	4,054
Talc	4,414	10,706
Tin and manufactures of (including tinware)	6,697,165	7,073,375
Whiting and prepared chalk	162,864	151,380
Zinc and manufactures of	1,824,519	1,576,943
	$238,212,835	$252,806,046

(*b*) Nine months only.

METALLIC ORES AND PRODUCTS.

Antimony.—There has been no production of antimony during the past two years, and no export of antimony ore is recorded in 1912 or 1913. The imports of antimony or regulus thereof, in 1913, were 667,050 pounds, valued at $49,408, and of antimony salts 23,649 pounds, valued at $2,421, or a total value of imports of $51,829. In 1912, the imports were antimony and regulus 908,045 pounds, valued at $60,456, and antimony salts 55,683 pounds, valued at $7,197, or a total value of imports of $67,653.

Cobalt.—Cobalt oxide and cobalt material are being produced in Canadian smelters, the production in 1913 of cobalt oxide being 660,079 pounds valued at $525,028, nickel oxide 268,304 pounds, valued at $80,561, and of cobalt residues and mixed oxides to the value of $90,266 containing 403,882 pounds cobalt and 293,870 pounds nickel. During 1912, the production of cobalt oxide and nickel oxide was 349,054 pounds, valued at $156,256, and of cobalt material and mixed cobalt and nickel oxides 1,285,280 pounds, valued at $163,988.

There was an import of 422 hundredweight of cobalt ore valued at $11,487 during 1913.

Copper.—The production of copper contained in blister, matte, or ore, which was practically all exported, was 76,976,925 pounds in 1913, valued at $11,753,606, as compared with 77,832,127 pounds in 1912, valued at $12,718,548.

The exports in 1913 were reported as 82,650,360 pounds, valued at $9,602,911, as against exports of 78,488,564 pounds, valued at $9,036,479, in 1912. The total imports of copper in 1913 were valued at $7,414,610; and included crude and manufactured copper to the extent of 43,054,418 pounds, valued at $7,044,297, together with other manufactures of copper of which the quantity is not recorded, valued at $370,313. The copper imports in 1912 were valued at $7,047,356, including 42,832,747 pounds of crude and manufactured copper, valued at $6,741,895, and other copper manufactures of which the quantity is not recorded, valued at $305,461.

Gold.—The total value of the production of gold in 1913 was $16,598,923, representing 802,973 fine ounces, as compared with $12,648,794, representing 611,885 fine ounces of metal in 1912.

The Yukon placer production in 1913 was 282,320 fine ounces, valued at $5,836,072.

Of the total production in 1913 about $6,346,072 were derived from alluvial workings; $5,185,544 as bullion from milling ores, and $5,067,307 from ores and concentrates sent to smelters. In 1912, $6,106,677 were derived from alluvial workings; $2,270,331 as bullion from milling ores, and $4,271,786 from ores and concentrates sent to smelters.

The exports of gold-bearing dust, quartz, nuggets, and gold in ore, etc., in 1913, were valued at $12,770,838, as against $10,014,654 in 1912.

The imports of gold bullion during the calendar year 1913 were $840,435, of gold coin $12,495,028, and of manufactures of gold and silver $1,055,837.

Pig-Iron.—The total production of pig-iron in Canadian blast furnaces in 1913 was 1,128,967 tons, valued at $16,540,012, of which it is estimated 1,055,459 tons, valued at $15,543,583, should be credited to imported ores, and 73,506 tons, valued at $996,429, to domestic ores. In 1912 the total production was 1,014,587 tons, valued at $14,550,999, of which 978,232 tons, valued at $14,100,133, should be credited to imported ores, and 36,355 tons, valued at $450,886 to domestic ores.

The exports of pig-iron, including ferro-products, in 1913, were 6,326 tons, valued at $351,646, as against 6,976 tons, valued at $310,702, in 1912. The imports of pig-iron in 1913 were 235,843 tons, valued at $3,234,877, ferro-manganese, etc., 30,355 tons, valued at $940,443, and charcoal pig 926 tons, valued at $12,528, as compared with imports in 1912 of pig-iron 272,565 tons, valued at $3,511,599, ferro-manganese, etc., 19,810 tons, valued at $469,884, and charcoal pig 115 tons, valued at $1,370.

The total exports of iron and steel and manufactures thereof, in 1913, were valued at $13,999,149, as against $10,682,484 in 1912. The imports of iron and steel and manufactures thereof during the calendar year 1913 were valued at $141,272,357, as compared with $144,400,949 during the fiscal year ending March 31, 1913.

Iron Ore.—The total shipments of iron ore from Canadian mines in 1913 were 307,634 tons, valued at $629,843, as compared with 215,883 tons, valued at $523,315, in 1912. The quantity of imported iron ore used in Canada in 1913 was about 2,110,828 tons, as compared with 2,019,165 tons of imported ore used in 1912.

Lead.—The production of lead in 1913 was 37,662,703 pounds, valued at $1,754,705, as against 35,763,476 pounds, valued at $1,597,554, in 1912. The exports of lead in 1913 were: lead in ore, etc., 329,960 pounds, valued at $9,136; while in 1912 the exports were: lead in ore, etc., 299,240 pounds, valued at $8,193. The total value of the imports of lead and manufactures of, in 1913, was $1,215,433, as compared with imports in 1912, valued at $1,806,221.

Nickel.—The production of nickel contained in nickel-copper matte produced in Canada and exported for refinement was, in 1913, 49,676,772 pounds, valued at $14,903,032, as compared with a production of 44,841,542 pounds, in 1912, valued at $13,452,463. During 1913 there were smelted 823,403 tons of ore, producing 47,150 tons of matte, as against 725,065 tons of ore, producing 41,925 tons of matte, in 1912. Small quantities of nickel-oxide are also produced in connexion with the treatment of the Cobalt District silver ores. The exports of nickel contained in ore, matte, etc., during 1913, were 49,459,017 pounds, valued at $5,195,560; being 5,164,512 pounds to Great Britain, 44,224,119 pounds to the United States, and 70,386 pounds to other countries. In 1912, the exports were 44,221,860 pounds, valued at $4,661,758: being 5,072,867 pounds to Great Britain and 39,148,993 pounds to the United States. The imports of nickel and nickel anodes in 1913 were valued at $8,512, as against a value of $23,125 imported in 1912. There was also an importation of nickel-silver in bars, ingots, valued at $162,520, and of manufactures of nickel, valued at $86,672, in 1913.

Silver.—The production of silver contained in bullion, or estimated as recovered from mattes and ores, etc., exported, was in 1913, 31,845,803 fine ounces, valued at $19,040,924, as compared with 31,995,560 fine ounces, valued at $19,440,165, in 1912. About 89·2 per cent of the production in 1913 was derived from "Cobalt District" of Ontario. The production of silver in 1905 was only 6,000,023 ounces, and in 1900, 4,468,225 ounces. The exports of silver contained in ores, mattes, etc., in 1913, were 37,371,569 ounces, valued at $21,441,220; as against exports of 34,911,922 ounces, valued at $19,494,416, in 1912. The imports of silver bullion during the calendar year 1913 were valued at $840,245, as compared with bullion imports of $1,100,344 in 1912.

Zinc.—The shipments of zinc ore in 1913 were 7,889 tons, valued at $186,827, as compared with shipments of 6,415 tons, valued at $215,149, in 1912. The total value of the imports of zinc and manufactures of zinc, in 1913, was $1,576,943, as compared with imports, valued at $1,824,519, in 1912.

NON-METALLIC PRODUCTS.

Actinolite.—A production of 66 tons, valued at $720, was reported in 1913, as compared with 92 tons, valued at $1,000, in 1912.

Arsenic.—Smelter returns show a production in 1913 of 1,692 tons of arsenious oxide, valued at $101,463, as compared with a production in 1912 of 2,045 tons, valued at $89,262.

The exports of arsenic in 1913 were 1,303 tons, valued at $107,094, as against 1,924 tons, valued at $101,310, in 1912. The imports of arsenious oxide in 1913 were 18,788 pounds, valued at $1,061, as compared with 76,528 pounds, valued at $1,722, in 1912. The imports of sulphide of arsenic in 1913 were 455,394 pounds, valued at $17,759, and in 1912, 451,928 pounds, valued at $19,431.

Asbestos.—The shipments of asbestos in 1913 were 136,951 tons, valued at $3,830,909, and of asbestic, 24,135 tons, valued at $19,016. The shipments in 1912 were of asbestos 111,561 tons, valued at $3,117,572, and of asbestic, 24,740 tons, valued at $19,707. The shipments in 1913 consisted of 5,660·3 tons of crude asbestos, valued at $989,162, and 131,291 tons of mill stock, valued at $2,841,747. Considerable quantities both of crude and of mill stock were held in manufacturers' hands at the close of the year.

Exports in 1913 were 103,812 tons of asbestos, valued at $2,848,047, as against 88,008 tons, valued at $2,349,353, in 1912. There were also exported in 1913, 24,766 tons of asbestic sand, valued at $138,737.

Imports of asbestos and manufactures of asbestos in 1913 were valued at $520,082, and in 1912, $461,449.

Chromite.—During 1913 and 1912 there were no shipments of chromite reported.

Coal.—The production of coal in 1913 was 15,012,178 tons, valued at $37,334,940, as against 14,512,829 tons, valued at $36,019,044, in 1912. The exports of coal in 1913 were 1,562,020 tons, valued at $3,961,351, as compared with 2,127,133 tons, valued at $5,821,593, in 1912. The total imports of coal in 1913 were 18,201,953 tons, valued at $47,949,119, as against imports in 1912 of 14,595,810 tons, valued at $39,478,037.

The 1913 imports included 10,743,473 tons of bituminous round and run of mine coal, valued at $21,756,658; 4,642,057 tons of anthracite and anthracite dust, valued at $22,034,839; and of bituminous slack, such as will pass through a ¾" screen, 2,816,423 tons, valued at $4,157,622.

The 1912 imports included 8,491,840 tons of bituminous round and run of mine coal, valued at $16,846,727; 4,184,017 tons of anthracite and anthracite dust, valued at $20,080,388; and 1,919,953 tons of bituminous slack, such as will pass through a ¾" screen, valued at $2,550,922. The consumption of coal in 1913 was approximately 31,582,545 tons, as against 26,934,800 tons in 1912.

Coke.—The total quantity of oven coke made in 1913 was 1,517,133 tons, the quantity sold or used was 1,530,499 tons, valued at $5,919,596; as compared with 1,406,028 tons made, in 1912, and 1,411,229 tons sold or used, valued at $5,164,331. The quantity of coal charged to coke ovens in 1913 was 2,247,913 tons, as compared with 2,053,807 tons in 1912. The exports of coke in 1913 were 68,235 tons, valued at $308,410, and in 1912, 57,744 tons, valued at $252,763. The imports of coke in 1913 were 723,906 tons, valued at $2,180,830, as compared with imports of 628,174 tons, valued at $1,702,856, in 1912.

Corundum.—The total sales of grain corundum in 1913 were 1,177 tons, valued at $137,036, as compared with sales of 1,960 tons, valued at $239,091 in 1912. Exports for 1913 were 1,077 tons, valued at $121,741.

Feldspar.—Shipments of feldspar in 1913 were 16,790 tons, valued at $60,795, as compared with 13,733 tons, valued at $30,916, in 1912. The exports are recorded as 15,966 tons, valued at $62,767, in 1913, and 12,779 tons, valued at $44,114, in 1912.

Fluorspar.—There was no fluorspar shipped in 1913, a small shipment of about 40 tons, valued at $240, being reported in 1912. Canadian furnaces in 1913 used 10,687 tons of fluorspar. Imports of hydrofluosilicic acid were 1,182,293 pounds, valued at $46,517.

Graphite.—Shipments of crude and milled graphite during 1913 totalled 2,162 tons, valued at $90,282, as against 2,060 tons, valued at $117,122, in 1912 The production of artificial graphite in 1913 was reported as 1,092 tons, as compared with 1,151 tons in 1912.

Exports of plumbago in 1913 are reported as 1,642 tons, valued at $85,368, and manufactures of plumbago valued $24,284. Exports in 1912 were: plumbago 1,654 tons, valued at $70,765, and manufactures of plumbago valued at $58,920. Imports of graphite in 1913 were valued at $156,233, and included: plumbago not ground $9,375; blacklead $8,633; plumbago ground and manufactures of, $64,254; and crucibles of clay or plumbago, $73,971. In 1912 the imports were valued at $155,484, including: plumbago not ground $7,249; blacklead $9,587; plumbago ground and manufactures of, $56,324; and crucibles of clay or plumbago, $82,324.

Grindstones.—The production of grindstones, scythestones, and wood pulpstones, in 1913, was 4,837 tons, valued at $51,325, as compared with 4,412 tons, valued at $52,090, in 1912. The exports in 1913 were manufactured grindstones valued at $54,867; and in 1912 manufactured grindstones valued at $26,535. The imports of abrasives in 1913 included: grindstones valued at $145,247; burrstones, $1,784; emery in bulk, crushed or ground, $48,995; manufactures of emery, carborundum, etc., $135,654; pumice stone, $17,861; also iron sand, $10,168; sandpaper, $171,516; The 1912 imports comprised: grindstones valued at $112,020; burrstones, $1,409; emery in bulk, crushed or ground, $46,616; manufactures of emery, carborundum, etc., $130,571; pumice stone, $21,310; also iron sand, $13,347; sandpaper, $189,782.

Gypsum.—The total shipments of gypsum, crude and calcined, in 1913, were 636,370 tons, valued at $1,447,739, as compared with shipments of 578,458 tons, valued at $1,324,620 in 1912. The tonnage of gypsum mined or quarried in 1913 was 684,726, and the quantity calcined 147,532 tons.

In 1912, 549,856 tons of gypsum were mined or quarried, and 133,392 tons calcined. The shipments in 1913 included: crude gypsum 499,460 tons, valued at $615,493; ground gypsum 10,281 tons, valued at $20,576; and calcined gypsum 126,629 tons, valued at $811,670. In 1912 the shipments comprised: crude gypsum 453,577 tons, valued at $525,345; ground gypsum 15,487 tons, valued at $29,244, and calcined gypsum 109,394 tons, valued at $770,031

The exports of gypsum in 1913 were: 417,302 tons of crude gypsum, valued at $504,383, and gypsum ground or calcined, valued at $5,795. The 1912 exports were: 364,643 tons of crude gypsum, valued at $423,208, and gypsum ground, or calcined, valued at $6,495.

The imports of gypsum in 1913 were valued at $188,252, including: crude gypsum, 4,522 tons, valued at $21,763; ground gypsum, 2,496 tons, valued at $11,770; and plaster of Paris, 20,113 tons, valued at $154,719. The total value of imports in 1912 was $268,103, made up of: crude gypsum, 3,503 tons, valued at $16,254; ground gypsum, 7,072 tons, valued at $19,651; and plaster of Paris, 32,496 tons, valued at $232,198.

Magnesite.—Shipments of magnesite in 1913 were 515 tons, valued at $3,335, and in 1912, 1,714 tons, valued at $9,645. Imports of magnesia in 1913 were 290,975 pounds, valued at $12,226.

Manganese.—There were no shipments of manganese in 1913, a shipment of 75 tons, valued at $1,875, being reported in 1912. The exports in 1913 were 8 tons, valued at $303, as against 10 tons, valued at $300, in 1912. The 1913 imports included, 2,588 tons manganese oxide, valued at $46,990, as compared with 1,256 tons, valued at $27,707, in 1912.

Mica.—The value of the mica production in 1913, as reported by mine operators, was $194,304, as compared with $143,976 in 1912. The exports of mica in 1913 were 817,152 pounds, valued at $240,775, as against 895,338 pounds, valued at $334,054, in 1912.

Mineral Pigments.—Shipments of barytes in 1913 were 641 tons, valued at $6,410, as against 464 tons, valued at $5,104, in 1912. The production of iron ochres in 1913 was 5,987 tons, valued at $41,774, as compared with 7,654 tons, valued at $32,410, in 1912.

In 1913 there were no exports of barytes, exports for 1912 being 68 hundredweight, valued at $114. The exports of iron oxides in 1913 were 1,956 tons, valued at $18,931, as against 3,016 tons, valued at $34,513, in 1912. The imports in 1913 were: ochres and ochrey earth and raw siennas, 1,663 tons, valued at $43,119; and oxides, dry fillers, fireproof umbers, and burnt siennas, 4,387 tons, valued at $240,435, as compared with imports in 1912, comprising: ochres and ochrey earth and raw siennas, 1,737 tons, valued at $40,165; and oxides, dry fillers, fireproof umbers, and burnt siennas, 762 tons, valued at $29,456.

Mineral Water.—The value of the production of mineral water in 1913 for which returns were received was $173,677, as compared with a value of $172,465, in 1912. The imports of mineral and aerated waters in 1913 were valued at $257,153, as against a value of $273,698, in 1912. The exports in 1913 were valued at $526, as against $4,667, in 1912.

Natural Gas.—The production of natural gas in 1913 was 20,478 million cubic feet, valued at $3,307,381, as compared with 15,287 million cubic feet, valued at $2,362,700, in 1912.

Peat.—Shipments of peat for fuel purposes in 1913 were 2,600 tons, valued at $10,100, as compared with 700 tons, valued at $2,900, in 1912.

Petroleum.—The production of crude petroleum shows a further falling off, but in quantity only, in 1913, the production being 228,080 barrels or 7,982,798 gallons, valued at $406,439; as compared with 243,336 barrels or 8,516,762 gallons, valued at $345,050, in 1912.

Exports of refined oil in 1913 were 24,273 gallons, valued at $3,188, and 36,945 gallons, valued at $6,147, in 1912. There was an export in 1913 of naphtha and gasoline of 17,875 gallons, valued at $4,284, crude, mineral oil, 3,6[illegible] gallons, valued at $379, and also an export of other oils, N.E.S., of 634,[illegible] gallons, valued at $171,663, which may have included products of petroleum.

While the production has been decreasing the imports have been increasing; the total import of petroleum oils, crude and refined, in 1913, was 222,779,028 gallons, valued at $13,238,429, in addition to 1,628,837 pounds of paraffin wax and candles, valued at $109,897. The oil imports included: crude oil, 162,061,926 gallons, valued at $5,250,835; refined and illuminating oils 19,393,627 gallons, valued at $1,394,440; gasoline 29,525,180 gallons, valued at $4,822,941; lubricating oils 6,789,451 gallons, valued at $1,172,986, and other petroleum products 5,008,844 gallons, valued at $597,227.

The total imports in 1912 were 186,787,484 gallons, valued at $11,858,533, and 2,144,006 pounds of paraffin wax and candles, valued at $119,520. The oil imports included: crude oil, 120,082,405 gallons, valued at $3,996,842; refined and illuminating oils 14,748,218 gallons, valued at $1,012,735; gasoline 40,904,598 gallons, valued at $5,347,767; lubricating oils 6,763,800 gallons, valued at $1,077,712, and other petroleum products 4,288,463 gallons, valued at $423,477.

Phosphate.—Shipments of phosphate or apatite in 1913 were 385 tons, valued at $3,643, as compared with 164 tons, valued at $1,640, in 1912. There were no exports in 1913 or 1912. There was an export of phosphoru in 1913, of 534,340 pounds, valued at $73,395; while in 1912, 543,620 pounds, valued at $66,806, were exported. The imports of phosphate rock (fertilizer) in 1913 were valued at $16,070; phosphorus, 17,600 pounds, valued at $5,856, and manufactured fertilizers valued at $505,904. The imports in 1912 included: phosphate rock (fertilizer), valued at $24,586; phosphorus, 13,807 pounds, valued at $4,012, and manufactured fertilizers valued at $580,351.

Pyrites.—The production of pyrites in 1913 was 158,566 tons, valued at $521,181, as compared with 81,526 tons, valued at $314,085, in 1912. The exports in 1913 were 46,066 tons, valued at $211,640, as against exports of 5,938 tons, valued at $11,935, in 1912. The imports of brimstone or sulphur in 1913 were 30,433 tons, valued at $633,114, as against 38,647 tons, valued at $806,690, in 1912.

Quartz.—The production of quartz in 1913 was reported as 78,261 tons, valued at $169,842, as compared with a production in 1912 of 100,242 tons, valued at $195,216. There were imported during 1913, 690 tons of silex or crystallized quartz, valued at $13,811, and 6,708 tons flint, valued at $60,718; and in 1912, 629 tons of silex, valued at $10,680, and 2,802 tons flint, valued at $39,891.

Salt.—The total sales of salt in 1913 were 10[illegible], valued at $491,280, (exclusive of packages). The value of the packages used was $262,479. In 1912 the sales were 95,053 tons, valued at $459,582, and value of packages used $224,696.

Exports of salt in 1913 were 460,900 pounds, valued at $3,047, and in 1912, 289,150 pounds, valued at $3,723. The total imports of salt in 1913 were valued at $565,283, and included: 31,508 tons, valued at $147,775, subject to duty; and 112,939 tons, valued at $417,508, duty free. The 1912 imports were valued at $485,950, and included: 30,067 tons, valued at $133,869, subject to duty; and 109,639 tons, valued at $352,081, duty free.

Among the imports of soda products in 1913 are included: soda ash or barilla, 66,323,869 pounds, valued at $492,115; soda bichromate, 674,456 pounds, valued at $33,767; caustic soda in packages of 25 pounds or more, 15,896,076 pounds, valued at $286,432; sal soda 8,688,607 pounds, valued at $53,649; nitrate of soda, 80,721,971 pounds, valued at $1,645,320, and sulphate of soda, 25,902,190 pounds, valued at $133,030.

Talc.—The production of talc in 1913 was 12,250 tons, valued at $45,980, as against 8,270 tons, valued at $23,132, in 1912. Imports of talc for the calendar year 1913 were 402 tons, valued at $10,706.

Tripolite.—There were 620 tons of tripolite, valued at $12,138, shipped in 1913, and 38 tons, valued at $230, in 1912.

STRUCTURAL MATERIALS AND CLAY PRODUCTS.

Cement.—The total sales of cement in 1913 were 8,658,805 barrels, valued at $11,019,418, as against 7,132,732 barrels, valued at $9,106,556, in 1912, showing an increase of 1,526,073 barrels. The exports of cement in 1913 were valued at $1,739, as compared with exports valued at $2,436, in 1912.

The imports of cement in 1913 included: manufactures of cement valued at $17,729; and Portland cement 889,324 hundredweight (254,093 barrels), valued at $409,303. The imports in 1912 were: manufactures of cement valued at $9,698; and Portland cement 5,020,446 hundredweight (1,434,413 barrels), valued at $1,969,529. The consumption of Portland cement in Canada in 1913 was approximately 8,912,898 barrels, as compared with 8,567,145 barrels in 1912.

Clay Products.—The total value of the production of clay products in Canada in 1913 was $9,504,314,as compared with a total value of $10,575,709 in 1912. Brick and tile products alone were valued in 1913 at $7,805,750, as against $9,072,675 in 1912. The value of sewerpipe production in 1913 was $1,035,906, as compared with $884,641, in 1912. The only clay products exported in 1913 were 977,000 building brick, valued at $8,579, manufactures of clay valued at $27,201, and earthenware valued at $16,553; against 694,000 building brick, valued at $8,493, manufactures of clay valued at $256, and earthenware valued at $10,001, in 1912. The total imports of clay products in 1913 were valued at $6,760,752, and included: brick and tile valued at $3,121,592; earthenware and chinaware $3,314,870; and clays valued at $324,290. The total imports in 1912 were valued at $6,592,540, and included: brick and tile valued at $3,209,190; earthenware and chinaware $3,094,956, and clays valued at $288,394.

Kaolin.—In 1913 a shipment of 500 tons valued at $5,000 was reported, as compared with shipments in 1912 of 20 tons valued at $160.

Lime.—The total production of lime in 1913 was 7,558,484 bushels, valued at $1,609,398, as compared with 8,475,839 bushels, valued at $1,844,849, in 1912. The exports of lime in 1913 were valued at $29,234, as against exports valued at $35,097, in 1912. The imports of lime in 1913 were 386,693 barrels, valued at $238,271, and in 1912, 329,925 barrels, valued at $207,481.

Sand-Lime Brick.—The total sales of sand-lime brick in 1913 were 92,586,676, valued at $906,665, an avergae value of $9.79 per thousand. The sales in 1912 were 96,448,402, valued at $1,020,386, an average value of $10.58 per thousand.

Slate.—The production of slate in 1913 was 1,432 squares, valued at $6,444, and 1,894 squares, valued at $8,939, in 1912.

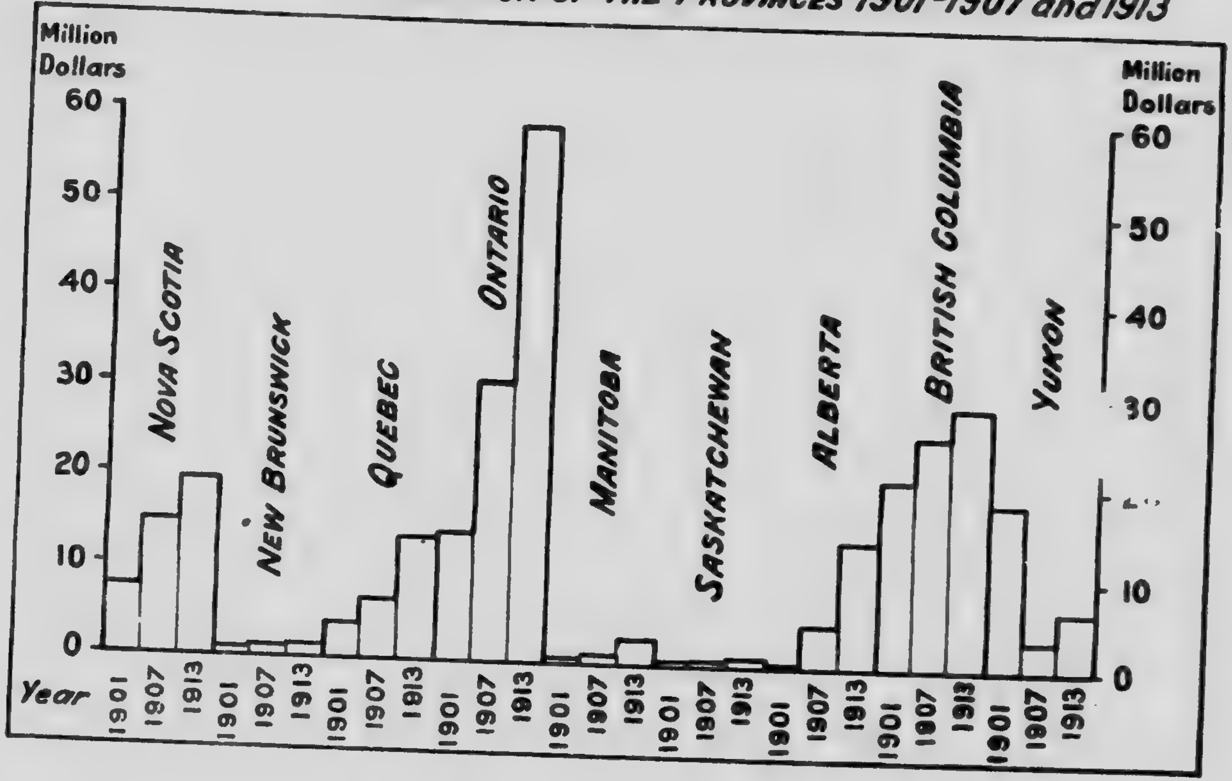
The imports of slate in 1913 were valued at $235,474, and included: roofing slate valued at $97,730; school writing slate, $51,953; slate pencils $9,166, and manufactures of slate, $76,625. The imports in 1912 were valued at $200,643, and included: roofing slate valued at $88,911; school writing slate $39,858; slate pencils, $6,978; and manufactures of slate, $65,896.

Stone—The total value of the production of stone of all kinds in 1913 was $5,504,639, as compared with a value of $4,726,171 in 1912. The value of stone exports in 1913 was $93,840, as against $33,242 in 1912; and the total value of stone imported in 1913 was $1,640,849, as against imports valued at $1,467,143, in 1912.

The production in 1913 included: granite, valued at $1,653,791; limestone, $3,204,091; marble, $249,975, and sandstone, $396,782. In 1912 the production of granite was valued at $1,373,119; limestone, $2,762,936; marble, $260,764, and sandstone, $329,352.

Sand and Gravel.—According to returns received which cannot be said to be complete, the production of sand and gravel in 1913 was valued at $2,258,874, as compared with $1,512,099, in 1912. The exports of sand and gravel in 1913 were 644,633 tons, valued at $440,956, and the imports 439,673 tons, valued at $440,343.

COMPARATIVE PRODUCTION OF THE PROVINCES 1901-1907 and 1913



PRODUCTION BY PROVINCES.

A summary of the mineral production by provinces in 1912 and 1913 is shown in the accompanying tables, in the first of which the total production in the several provinces and the percentages of each, are given for the past three years. The provinces maintained the same order of magnitude of output with the exception that Saskatchewan replaced New Brunswick for the smallest production in 1913. Ontario continues as the largest contributor to the total, having a production of $59,167,749 or 40·6 per cent, as against $51,985,876 or 38·5 per cent of the total in 1912. British Columbia was second, with a production of $28,086,312 or 19·3 per cent of the total, as against $30,076,635 or 22·3 per cent of the total in the previous year. There was a falling off in the total in this Province was also in Manitoba and Saskatchewan, all the other provinces showing an increased production. Nova Scotia, third in importance, had a production of $19,376,183 or 13·3 per cent of the total in 1913. Alberta in fourth place had a production of $15,054,046, or 10·3 per cent; Quebec occupied fifth place, with a production of $13,475,534 or 9·3 per cent. The Yukon district, Manitoba, New Brunswick, and Saskatchewan, follow in the order named.

In making these comparisons it should be remembered that Nova Scotia is not credited with the large production of pig-iron and steel at Sydney and Sydney Mines, which is made almost entirely from imported iron ores and is naturally not credited as Canadian mine product. Similarly a large proportion of the pig-iron production in Ontario is excluded from the total value, because it is derived from imported ores. The Province of Quebec also, is not credited with the production of aluminium at Shawenegan Falls, which is made from imported bauxite.

Mineral Production by Provinces, 1911, 1912, and 1913.

Province.	1911.		1912.			
	Value of production.	Per cent of total.	Value of production.	Per cent of total.	Value of production.	Per cent ot total.
	$	%	$	%	$	%
*Nova Scotia	15,409,397	14·93	18,922,236	14·01	19,376,183	13·30
New Brunswick	612,830	0·59	771,004	0·57	1,102,613	0·76
Quebec	9,304,717	9·01	11,656,998	8·63	13,475,534	9·25
Ontario	42,796,162	41·46	51,985,876	38·50	59,167,749	40·63
Manitoba	1,791,772	1·74	2,463,074	1·83	2,214,496	1·52
Saskatchewan	636,706	0·62	1,165,642	0·86	881,142	0·60
Alberta	6,662,673	6·46	12,073,589	8·94	15,054,046	10·34
British Columbia	21,29[illegible],305	20·63	30,076,635	22·27	28,086,312	19·29
Yukon	4,[illegible],432	4·56	5,933,242	4·39	6,276,737	4·31
Dominion	103,220,994	100·00	135,048,296	100·00	145,634,812	100·00

*Includes a small production of lime from Prince Edward Island.

Mineral Production of Nova Scotia, 1912 and 1913.

Product.		1912.		1913.	
		Quantity.	Value.	Quantity.	Value.
			$		$
Gold	Ozs.	4,385	90,638	2,174	44,935
Iron ore sold for export	Tons	30,857	168,877	20,436	21,049
Pig-iron from Canadian ore*	"	....	....	2,617	39,255
Barytes	"	464	5,104	641	6,410
Coal	"	7,783,888	17,374,750	7,980,073	17,812,663
Grindstones	"	374	3,700	350	4,900
Gypsum	"	376,082	481,493	404,801	479,515
Manganese	"	75	1,875	0	0
Tripolite	"	38	230	620	12,138
Clay products		....	272,053	....	332,272
Lime	Bus.	709,596	145,121	854,812	171,339
Stone		....	324,630	....	350,511
Other products		....	53,705	....	101,196
Total		....	18,922,236	....	19,376,183

*The total production of pig-iron in Nova Scotia in 1912 was 424,994 tons valued at $6,374,910, and in 1913, 480,068 tons valued at $7,201,020; all produced from imported ore.

Mineral Production of New Brunswick, 1912 and 1913.

Product.		1912.		1913.	
		Quantity.	Value.	Quantity.	Value.
			$		$
Iron ore sold for export	Tons.	71,520	127,716	80,941	144,537
Coal	"	44,780	89,560	70,311	166,637
Grindstones	"	4,038	48,330	4,487	46,425
Gypsum	"	82,757	185,821	103,954	279,395
Natural gas	M cub. ft	173,903	36,549	828,603	174,147
Petroleum	Bls.	2,679	3,799	2,111	3,762
Clay products		....	54,910	....	62,269
Lime	Bus.	616,835	133,742	392,985	98,841
Stone		....	90,577	....	103,732
Other products		....	....	....	22,868
Total			771,004	....	1,102,613

Mineral Production of Quebec, 1912 and 1913.

Product.		1912.		1913.	
		Quantity.	Value.	Quantity.	Value.
			$		$
Copper	Lbs.	3,282,210	536,346	3,455,887	827,679
Gold	Ozs.	642	13,270	701	14,491
Iron ore sold for export	Tons.	1,185	4,232	5,102	26,990
Silver	Ozs.	9,465	5,758	34,573	20,672
Zinc ore	Tons.	....	....	335	6,700
Asbestos and asbestic	"	136,301	3,137,279	161,086	3,849,925
Feldspar	"	100	2,000	74	1,554
Graphite	"	604	50,680	103	9,620
Magnesite	"	1,714	9,645	515	3,335
Mica	"	....	81,044	626	125,488
Mineral water	Gals.	92,873	36,736	....	30,805
Ochres, iron oxides	Tons.	7,654	32,410	5,987	41,774
Peat	"	500	2,000	2,000	8,000
Phosphate	"	164	1,640	385	3,643
Pyrites	"	60,849	243,396	87,314	349,256
Quartz	"	556	1,240	1,008	2,000
Cement	Bls.	2,714,685	3,134,499	2,940,211	3,430,023
Clay products		....	1,980,300	....	1,601,816
Kaolin	Tons.	20	160	500	5,000
Lime	Bus.	1,729,614	474,595	1,616,446	418,008
Slate	Squares	1,894	8,939	1,432	6,444
Stone		....	1,957,703	....	2,329,461
Other products		....	243,126	....	662,841
Total		....	11,656,998	....	13,475,534

There was also in this Province an important production of aluminium from imported ores.

Mineral Production of Ontario, 1912 and 1913.

Product.	1912.		1913.	
	Quantity.	Value.	Quantity.	Value.
		$		$
Nickel oxide.......................... Lbs.	349,054	156,256	268,304	80,561
Cobalt oxide .... "			660,079	525,028
Cobalt-nickel residues, mixed cobalt and nickel oxides .... "	1,285,280	163,988	....	90,266
Copper.............................. "	22,250,601	3,635,971	25,885,929	3,952,522
Gold..............................Ozs.	86,523	1,788,596	219,801	4,543,690
Iron ore, sold for export..............Tons.	14,567	28,125	110,135	237,976
Iron pig from Canadian ore (a)........ "	36,355	450,886	70,889	957,174
Lead.................................Lbs.			33,000	1,537
Nickel.............. "	44,841,542	13,452,463	49,676,772	14,903,032
Silver..............................Ozs.	29,214,025	17,772,352	28,411,261	16,987,377
Zinc ore............................Tons.	10	3,750	....	....
Actinolite.............. "	92	1,000	66	720
Arsenious oxide "	2,045	89,262	1,692	101,463
Corundum.... "	1,960	239,091	1,177	137,036
Feldspar .. "	13,633	28,916	16,716	59,241
Fluorspar.. "	40	240	0	0
Graphite.... "	1,456	66,442	2,050	80,662
Gypsum ...... "	53,119	176,066	62,315	208,029
Mica	....	62,932	478	68,816
Mineral water..............	....	131,529	....	138,072
Natural gas....................M. cub. ft.	12,529,463	2,036,245	12,474,745	2,055,768
Peat..............................Tons.	200	900	600	2,100
Petroleum.........................Bls.	240,657	341 251	225,960	402,677
Pyrites..........................Tons.	20,677	70,689	71,252	171,925
Quartz.. "	99,686	193,976	77,253	167,842
Salt.............. "	95,053	459,582	100,791	491,280
Talc.............. "	8,270	23,132	12,250	45,080
Cement.................. Bls.	3,044,713	3,372,897	3,992,988	4,311,183
Clay products.	...	4,864,700	....	5,220,467
Lime.................. [illegible]	3,376,1[illegible]	573,269	3,254,482	573,209
Sand-lime brick............ No.	36,371,002	328,548	48,211,502	420,177
Stone........		1,109,164	....	1,593,168
Other products..		363,668	....	638,771
Total.......		51,985,876	....	59,167,749

(a) The total production of pig-iron in Ontario in 1912 was 589,593 tons, valued at $8,176,089; in 1913, 648,899 tons, valued at $9,338,992.

Mineral Production of Manitoba, 1912 and 1913.

Product.		1912.		1913.	
		Quantity.	Value.	Quantity.	Value.
			$		$
Calcined gypsum.	Tons.	66,500	481,250	65,100	479,500
Clay products....	......	....	1,018,051	....	514,358
Lime...............	Bus.	818,237	168,257	576,938	107,281
Cement..............	Bls.	12,127	16,068	179,342	326,856
Sand-lime brick	No.	27,504,874	294,700	19,619,555	198,878
Stone................	......	....	383,095	....	389,904
Other products.			101,653		107,719
Total			2,463,074		2,214,496

Mineral Production of Saskatchewan, 1912 and 1913.

Product.		1912.		1913.	
		Quantity.	Value.	Quantity.	Value.
			$		$
Coal......................................	Tons.	225,342	368,135	212,897	358,192
Brick, common and pressed....	No.	30,538,771	332,943	18,175,000	189,820
Lime	Bus.	4,000	1,440	35,000	10,000
Sand-lime brick...	No.	16,292,114	207,671	7,290,714	86,753
Other products.....	.....	....	255,453	....	236,377
Total. ..	.....		1,165,642	....	881,142

(a) In 1911, included in "Other products."

Mineral Production of Alberta, 1912 and 1913.

Products.		1912.		1913.	
		Quantity.	Value.	Quantity.	Value.
			$		$
Gold....... ...	Ozs.	73	1,500		
Coal	Tons.	3,240,577	8,113,525	4,014,755	10,418,941
Natural gas ..	M. ft.	2,583,437	289,906	7,174,490	1,079,466
Cement........	Bls.	821,165	1,775,898	956,169	1,947,933
Clay products..	....	....	1,356,184	....	893,408
Lime........	Bus.	704,035	166,520	465,250	115,355
Sand-lime brick..	No.	10,732,000	139,952	15,464,905	176,794
Stone...............	..	....	81,391	....	156,984
Other products.......	.....	....	148,704	....	265,165
Total.......		...	12,073,589	....	15,054,046

Mineral Production of British Columbia, 1912 and 1913.

Product.		1912.		1913.	
		Quantity.	Value.	Quantity.	Value.
			$		$
Copper (a)	Lbs.	50,526,656	8,256,561	45,791,579	6,991,916
Gold	Ozs.	251,815	5,205,485	297,459	6,149,027
Lead	Lbs.	37,763,476	1,597,554	37,626,899	1,753,037
Platinum	Crude ozs.	....	....	18	489
Silver	Ozs.	2,651,002	1,612,737	3,312,343	1,980,483
Zinc ore	....	6,405	211,399	7,554	180,127
Coal	Tons.	3,208,997	10,028,116	2,714,420	8,482,562
Gypsum	"	....	....	200	1,300
Mineral water			4,200	....	4,800
Cement	Bls.	511,539	767,038	574,258	980,560
Clay products	....	....	996,568	....	684,904
Lime	Bus.	517,329	181,905	362,571	115,365
Sand-lime brick	No.	5,458,412	49,515	Nil.	....
Stone	....	....	779,611	....	580,879
Other products		....	385,946	....	180,863
Total	...	....	30,076,635	....	28,086,312

(a) Smelter recoveries of copper.

Mineral Production of Yukon, 1912 and 1913.

Product.		1912.		1913.	
		Quantity.	Value.	Quantity.	Value.
			$		$
Copper	Lbs.	1,772,660	289,670	1,843,530	281,489
Gold	Ozs.	268,447	5,549,296	282,838	5,846,780
Lead	Lbs.	....	....	2,804	131
Silver	Ozs.	81,058	49,318	87,626	52,392
Coal	Tons.	9,245	44,958	19,722	95,945
Total	....	.....	5,933,242	....	6,276,737

Mineral Production by Provinces, 1899-1913.

Calendar Year.	Nova Scotia.*	New Brunswick.	Quebec.	Ontario.	Manitoba.	Alberta.	Saskatchewan.	Yukon.	British Columbia.	Total.
	$	$	$	$	$	$	$	$	$	$
1899	6,817,274	420,227	2,585,635	9,819,557	17,108,707				12,482,605	49,234,005
1900.	9,298,479	439,060	3,292,383	11,258,099	23,452,330				16,680,526	64,420,877
1901.	7,770,159	467,985	3,759,984	13,970,010	19,297,940				20,531,833	65,797,911
1902.	10,686,549	607,129	3,743,636	14,619,091	16,127,400				17,448,031	63,231,836
1903.	11,431,914	580,495	3,585,938	14,160,033	14,082,986				17,899,147	61,740,513
1904.	11,212,746	559,913	3,688,482	12,582,843	12,713,613				19,325,174	60,082,771
1905.	11,507,047	559,035	4,405,975	18,833,292	11,387,642				22,386,008	69,078,999
1906.	12,894,303	646,328	5,242,058	25,111,682	10,092,726				25,299,600	79,286,697
1907.	14,532,040	664,467	6,205,553	30,381,638	898,775	4,657,524	533,251	3,335,898	25,656,056	86,865,202
1908.	14,487,108	579,816	6,372,949	30,623,812	584,374	5,122,505	413,212	3,669,290	23,704,035	85,557 101
1909.	12,504,810	657,035	7,086,265	37,374,577	1,193,377	6,047,447	456,246	4,032,678	22,479,006	91,831,441
1910.	14,195,730	581,942	8,270,136	43,538,078	1,500,359	8,996,210	498,122	4,764,474	24,478,572	106,823,623
1911.	15,409,397	612,830	9,304,717	42,796,162	1,791,772	6,662,673	636,706	4,707,432	21,299,305	103,220,994
1912.	18,922,236	771,004	11,656,998	51,985,876	2,463,074	12,073,589	1,165,642	5,933,242	30,076,635	135,048,296
1913.	19,376,183	1,102,613	13,475,534	59,167,749	2,214,496	15,054,046	881,142	6,276,737	28,086,312	145,634,812

*Includes a small production of lime from Prince Edward Island.

MINE PRODUCTION.

Reference has already been made in the introduction to this report, to the compilation of a total value of the mineral production of Canada in which the metallic ores are included at the value of the ores as mined or shipped from the mines. Since 1910 this Branch has endeavoured to obtain from every mine operator in Canada, an annual return with respect to labour employed, wages paid, tonnage and value of ores or minerals mined, treated and shipped, and in the case of metallic ores the quantities of metals contained in the ores shipped or treated.

There are two industries: gold placer mining, and the production of crude petroleum for which it has not been possible as yet to obtain complete returns from the operators themselves, so that in these cases, while a record of production is available there is no record of the labour employed, nor the wages paid.

Statistics covering each of the past four years are shown in the accompanying tables. According to the records shown the total value of the mineral production on this basis was $126,444,201 in 1913, as against $120,332,966 in 1912, $91,876,084 in 1911, and $92,501,244 in 1910. Excluding placer and hydraulic workings and petroleum wells, the total number of shipping mines, clay works, quarries, etc., in 1913, was 1,529, as against 1,437, in 1912; the total number of men employed 71,011 in 1913, as against 66,734 in 1912: the total wages paid $50,368,602 in 1913, as against $45,502,479 in 1912.

The total number of metalliferous mines shipping in 1913, exclusive of placer and hydraulic workings, was 183 as against 163, in 1912; number of men employed in 1913, 12,437, as against 10,612 in 1912; wages paid $11,746,400 in 1913; compared with $10,113,578 in 1912: tons of ore mined 4,736,288 in 1913, as against 4,194,517 in 1912; tons of ore, concentrates or metal shipped from mines, 3,423,414, as against 3,360,451 in 1912; to total net value of shipments including placer gold $47,170,740 in 1913, compared with $46,457,423 in 1912.

In non-metalliferous mining exclusive of stone quarries, clay works, etc., and not including petroleum wells, there were employed in 1913 an average of 34,207 men, earning in wages $25,752,148, as against 33,954 men and $23,877,781 paid in wages in 1912. The tonnage mined in 1913, chiefly coal, was 18,636,039, and tons shipped, 16,198,066, as against 17,165,628 tons mined and 15,548,981 tons shipped in 1912. The total net value of the shipment in 1913 was $48,463,709, and $45,080,674 in 1912.

The manufacture of cement, clay products, and lime, and the quarrying of stone, etc., employed in 1913 an average of 24,367 men, to whom was paid in wages $12,870,054, and the net value of products shipped was $30,809,752. These operations in 1912 engaged an average of 22,168 men, earning $11,511,120 in wages, and the net value of the products shipped was $28,794,869.

It should be remembered that these records cover only active shipping mines and do not include the labour employed in prospecting or in developing new properties, nor is there included any record of the labour employed in the smelting and refining of ores, or in blast furnace operations.

The total value of the production given herewith is considerably less than that shown in the table of mineral production, given on page 3, the difference being due entirely to the fact that the values accruing through metallurgical reduction and refining, are not included in these tables. The values of the ores given herein are in general those furnished by the operators. In certain cases however, where mining, smelting, and refining operations are carried on by the same operator, it becomes a matter of no small difficulty to satisfactorily subdivide profits among the various operations, particularly when there is no general market for the class of ores treated, and it is quite possible that some of the values used are too low.

There has been added to the statement of ore shipment in 1913, a table showing the quantities of metals contained in the ores shipped, the record showing the total quantities of metals contained without any deductions or allowances being made for smelter or treatment losses. Comparison of this record of metal contents of ore shipments with statistics of the production of the metals is not in all cases feasible because of the long lapse of time between the shipment from the mine and the treatment at the smelter.

Mine Production, 1910.

—	No. of mines or works.	Men employed.		Wages paid.	Ores or minerals mined.	Metals, ores, concentrates or minerals shipped.	Net value of shipments.
		Underground.	Surface.				
M[illegible]TALLIFEROUS ORES.	No.	No.		$	Tons.	Tons.	$
Iron ores	8	971		443,998	335,768	259,418	574,362
Milling gold ores—							
Bullion shipped	......	......	......	......	......	......	659,987
Concentrate	47	969		725,989	138,021	8,997	565,340
Silver-cobalt ores—							
Mine bullion shipped	......	......	......	......	......	35	542,034
Ore and concentrate	38	1,623	1,322	2,642,133	274,780	35,627	15,344,470
Nickel-copper ores	7	660	286	719,237	652,392	652,392	2,609,568
Copper ores	3	118	97	105,366	54,220	36,714	172,162
Silver-lead and zinc ores	48	592	282	850,416	180,070	58,418	1,668,415
Copper-gold-silver ores	19	1,432	487	1,872,242	1,958,591	1,924,405	7,888,306
Shipping mines not reporting:—							
Silver-lead	12				1,994	1,994	......
Copper-gold	9	......	......	......			
Placer mining—							
Yukon	......	......	......	......			4,550,000
British Columbia	......	......	......	......	......	......	540,000
Other provinces	......	......	......	......	......	......	1,850
Total metallic	191	8,839		7,359,381	3,595,836	2,978,000	35,116,494
Total non-metallic	......	36,210		22,698,000	16,148,993	13,800,989	37,757,158
Total structural material	......	17,259		7,547,000	......	......	19,627,592
Total	......	62,308		37,604,381	......	......	92,501,244

Mine Production, 1911.

----	No. of mines or works.	Men employed.		Wages paid.	Ores or minerals mined.	Metals, ores, concentrates or minerals shipped.	Net value of shipments.
		Under-ground.	Sur-face.				
METALLIFEROUS ORES.	No.	No.		$	Tons.	Tons.	$
Iron ores	8	943		449,468	421,113	210,344	522,319
Milling gold ores—	45	1,085		954,659	118,758		
Bullion shipped							513,991
Concentrates						8,026	663,213
Silver-cobalt ores—	36	1,794	1,448	2,722,228	254,290		
Mine bullion shipped						130	2,007,440
Ore and concentrate						25,539	14,400,245
Nickel-copper ores	7	858	425	889,894	612,511	612,511	2,450,044
Copper ores	2	119	67	98,084	66,088	39,047	247,555
Silver-lead and zinc ores	40	528	297	809,862	120,323	48,660	1,186,996
Gold-copper-silver ores	22	1,495	563	1,933,385	1,602,247	1,486,931	7,727,696
Placer mining—							
Yukon							4,606,812
British Columbia							426,000
Other provinces							8,202
Total metalliferous	160	9,622		7,857,580	3,195,330	2,431,188	34,760,513
" non-metalliferous		32,126		18,469,420	13,890,468	12,247,348	34,405,960
Total structural materials		19,004		8,827,508			22,709,611
		60,7[illegible]		35,154,508			91,876,084

Mine Production, 1912.

	No. of mines or works.	Men employed.		Wages paid.	Ores or minerals mined.	Metals, ores, concentrates or minerals shipped.	Net value of shipments.
		Underground.	Surface.				
METALLIFEROUS ORES.	No.	No.		$	Tons.	Tons.	$
Iron ores	8	524		371,938	171,792	215,883	523,315
Milling gold ore—							
Bullion shipped	43					5	2,278,066
Concentrates	...	1,671		1,551,006	290,297	6,114	669,727
Silver-cobalt ores—							
Mine bullion shipped	31					[illegible]	2,899,360
Ore and concentrate	...	1,685	1,448	3,107,286	319,348	29,106	14,592,559
Nickel-copper ores	8	970	830	1,404,652	737,726	737,726	2,953,306
Copper ores	3	[illegible]	95	160,765	64,952	60,869	508,993
Silver-lead and sinc ores	50	[illegible]	331	1,002,203	202,343	66,377	2,767,741
Gold-copper-silver ores	20	1,434	873	2,515,728	2,408,059	2,244,193	13,113,144
Tungsten corsets	...	...				14	7,840
Placer mining—							
Yukon							5,576,493
British Columbia	...						555,500
Other provinces	...	.....					11,379
Total metalliferous	163	10,612		10,113,578	4,194,517	3,360,451	46,457,423
" non-metalliferous	443	33,954		23,877,781	17,165,628	15,548,981	45,080,674
Total structural materials	831	22,168		11,511,120	....	....	28,794,869
	1,437	66,734		45,502,479	....	...	120,332,966

Mine Production, 1913.

—	No. of mines or works.	Men employed.		Wages paid.	Ores or minerals mined.	Metals, ores, concentrates or minerals shipped.	Net value of shipments.
		Underground.	Surface.				
METALLIFEROUS ORES.	No.	No.		$	Tons.	Tons.	$
Iron ores	12	877		529,934	324,935	307,634	629,843
Milling gold ore—							
Bullion shipped.						11	5,060,018
Concentrates	50	2,210		2,079,005	515,855	10,269	873,901
Silver-cobalt ores—							
Mine bullion shipped						206	4,539,906
Ore and concentrate	30	2,089	1,525	3,387,069	456,241	40,579	12,565,718
Nickel-copper ores	9	1,258	617	1,665,659	784,697	784,697	3,138,788
Copper ores	3	191	92	155,318	97,899	87,376	458,136
Silver-lead and zinc ores	57	830	468	1,287,761	256,302	85,978	3,276,812
Zinc products						Zinc 7,889	186,827
Gold-copper-silver ores	22	1,413	867	2,641,654	2,300,359	2,09[illegible]75	10,056,739
Placer mining—							
Yukon							510,000
British Columbia							5,874,052
Other provinces							
Total metalliferous	183	12,437		11,746,400	4,736,288	3,423,414	47,170,740
" non-metalliferous	435	34,207		25,752,148	18,636,039	16,198,066	48,463,709
Total structural materials	911	24,367		12,870,054			30,809,752
	1,529	71,011		50,368,602			126,444,201

Mine Production 1913, Content of Shipments.

	Gold.	Silver.	Nickel.	Copper.	Lead.	Zinc.
	Ozs.	Ozs.	Lbs.	Lbs.	Lbs.	Lbs.
Milling gold ore—						
Bullion	250,851	59,015				
Concentrates	46,959	33,898		2,354	142,497	
Silver-cobalt ores—						
Mine bullion shipped		7,599,929				
Ore and concentrate		21,862,174				
Nickel-copper ores			51,203,607	27,010,719		
Copper ores	738	36,393		4,996,393		
Silver-lead zinc ores	999	2,564,155			53,807,570	
Zinc products		143,459				7,069,800
Gold-copper-silver ores	207,486	733,758		60,090,180		
Placer mining—						
Yukon	282,320	63,522				
British Columbia	24,671					
Total	814,024	33,096,303	51,203,607	92,099,646	53,950,067	7,069,800

Labour and Wages Statistics Covering Non-Metalliferous Mines During 1911, 1912, and 1913.

	1911.			1912.			1913.		
	No. active mines or works.	No. employed.	Wages paid.	No. active mines or works.	No. employed.	Wages paid.	No. active mines or works.	No. employed.	Wages paid.
NON-METALLIC.			$			$			$
Asbestos and asbestic	12	2,707	1,231,896	10	2,955	1,401,653	10	2,951	1,687,957
Coal	195	26,141	15,695,735	244	27,581	20,784,843	236	27,917	22,065,141
Feldspar	6	78	29,918	4	80	31,487	5	78	33,900
Graphite	7	302	106,000	7	221	86,831	6	135	53,714
Grindstones, pulpstones, scythestones	6	134	29,300	6	149	35,057	[illegible]	125	27,500
Gypsum	19	1,233	517,800	19	1,381	579,952	18	1,400	641,735
Mica and phosphate	30	231	73,870	26	241	95,415	27	209	85,334
Mineral pigments: barytes, and ochres	5	82	25,568	4	65	21,270	4	64	25,818
Mineral water	17	102	37,963	14	90	34,550	11	79	36,639
Natural gas	40	276	263,098	76	433	302,012	78	547	614,425
Peat	3	16	2,800	3	27	4,450	2	37	5,000
Pyrites	6	162	112,294	4	115	110,888	6	151	131,161
Quartz	8	145	52,543	7	128	80,340	6	130	69,441
Salt	12	225	123,040	12	231	155,648	12	251	178,386
Others‡	9	292	167,595	7	257	153,385	6	133	85,997
Total non-metallic	375	32,126	18,469,420	443	33,954	23,877,781	435	34,207	25,752,148
STRUCTURAL.									
Cement	24	3,010	2,103,838	26	3,461	2,623,902	27	4,276	3,466,451
Clay products	419	9,131	3,524,058	460	10,450	4,504,213	456	11,218	4,696,801
Lime	75	1,056	523,518	78	1,103	576,217	77	1,076	577,841
Sand-lime brick	16	337	166,902	20	544	349,192	22	589	289,398
Sand and gravel (a)	....	No record..	....	5	875	527,425	110	1,042	607,554
Slate	1	33	9,187		25	12,055	1	35	12,544
Stone	191	5,437	2,500,005	1	5,710	2,918,116	218	6,131	3,219,465
Total structural	726	19,004	8,827,508	831	22,168	11,511,120	911	24,367	12,870,054
" non-metalliferous	1,101	51,130	27,296,928	1,274	56,122	35,388 901	1,346	58,574	38,622,202

‡Includes: in 1911 and 1912—actinolite, chromite, corundum, fluorspar, magnesite, manganese, talc, and tripolite. Includes: in 1913—actinolite, corundum, tripolite, and talc. (a) No record in 1911. Partial record only in 1912 and 1913.

SMELTER PRODUCTION.

Statistics of the production of copper, lead, and silver smelters and refineries, showing the tonnage of ore treated, the matte, blister, base bullion, or refined metal produced, etc., have been collected by this Branch, since 1908.

The active smelting companies in 1913 were as follows:—

The Mond Nickel Company, Coniston, Ont.
The Canadian Copper Company, Copper Cliff, Ont.
The Coniagas Reduction Company, Thorold, Ont.
The Deloro Mining and Reduction Co., Deloro, Ont.
The Buffalo and Ontario Smelting Co., Kingston, Ont.
The Dominion Refineries, Ltd., North Bay, Ont.
The Metals Chemical Co., Ltd., Welland, Ont.
The North American Smelting Co., Kingston, Ont.
The Consolidated Mining and Smelting Co. of Canada, Ltd., Trail, B.C.
The Granby Consolidated Mining, Smelting and Power Co., Ltd., Grand Forks, B.C.
The British Columbia Copper Co., Ltd., Greenwood, B.C.

The total quantity of ores and concentrates treated in these works during 1913 was 3,037,391 tons, as compared with 3,005,410 tons in 1912. The largest proportion of the total tonnage about 70 per cent in 1913 consists of the copper-gold-silver ores of British Columbia, chiefly from the Boundary, (Phoenix and Greenwood), Rossland, and Coast (Britannia and Texada Island) districts. The nickel-copper ores of the Sudbury district, Ontario, contributed about 27 per cent of the tonnage, the balance being lead ores and other ores treated in lead furnaces and the silver-cobalt ores of Ontario.

The quantities of these several classes of ores smelted during the past six years have been as follows:—

Year.	Nickel-copper ores.	Silver-cobalt ores.	Lead ores.	Copper-gold silver ores.	Totals
1908	360,180	7,182	53,545	1,797,488	2,218,395
1909	462,336	8,384	54,539	1,850,889	2,376,148
1910	628,947	9,466	57,549	1,987,752	2,683,714
1911	610,834	9,330	55,408	1,517,981	2,193,553
1912	725,065	8,097	59,932	2,212,316	3,005,410
1913	823,403	6,124	88,110	2,119,754	3,037,391

The products obtained in Canada from the treatment of these ores include: pig lead produced at Kingston, Ont., refined pig lead and lead pipe produced at Trail, B.C.; and fine gold, fine silver, copper sulphate, and antimony produced from the residues of the Trail lead refinery; silver bullion, white arsenic, nickel oxide, and cobalt oxide produced in Ontario, from the Cobalt District ores. Refined antimony was produced in New Brunswick in 1909. In addition to these refined products, blister copper, copper matte, nickel-copper matte, cobalt material or mixed nickel and cobalt oxides are produced and exported for refining outside of Canada.

The aggregate results of smelting and refining operations may be summarized as shown in the next table. Unfortunately the figures cannot be taken to represent the total production from smelting ores mined in Canada, since considerable quantities of copper and silver ores are still shipped to other smelters outside of Canada for smelting.

It should also be explained that the figures include the results of the treatment in British Columbia of a small quantity of imported ores.

Smelter and Refinery Production in Canada.

Matte, blister copper, and other smelter products obtained and exported for refining.	1909.	1910.	1911.	1912.	1913.
	Tons.	Tons.	Tons.	Tons.	Tons.
(1) Blister copper	14,239	13,918	10,710	17,063	15,270
(2) Copper matte	11,597	11,519	11,320	6,727	5,159
(3) Nickel-copper matte	25 45	33,033	32,607	41,925	47,150
(4) Lead bullion	2,010	....	....	....	....
(5) Cobalt material	....	54	630	642	122

Refined products produced and metals contained in unrefined smelter products exported.		1911.		1912.		1913.	
		Refined products.	Metals contained in matte, blister, and base bullion.	Refined products.	Metals contained in matte, blister, and base bullion.	Refined products.	Metals contained in matte, blister, base bullion and speiss.
Gold	Ozs.	15,270	175,189	12,118	184,815	11,977	213,279
Silver	"	19,078,768	585,896	17,572,217	686,171	13,789,709	934,601
Lead	Lbs.	23,525,050	....	35,893,190	....	37,923,043	....
Copper	"	....	29,855,868	....	58,405,910	....	59,245,722
Copper sulphate	"	197,187	....	87,110	....	130,533	....
Nickel	"	....	34,098,744	....	44,841,542	....	49,676,772
Cobalt oxide	"	154,174		349,054		660,079	
Nickel oxide	"		....		....	268,304	....
White arsenic	"	4,194,209	....	4,090,768	....	3,384,249	....
Arsenic	"	....	....		....	....	....

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(1) Blister copper carrying gold and silver values.
(2) Copper matte " " "
(3) Bessemer nickel-copper carrying small gold and silver values as well as metals, of the platinum group.
(4) Unrefined lead bullion carrying silver values.
(5) Cobalt material carrying nickel and silver values.

Nickel-Copper Ores.—These ores of the Sudbury district, together with a small tonnage from the Alexo mine in the district of Nipissing, Ontario, are treated in the smelters of the Canadian Copper Company at Copper Cliff, and the Mond Nickel Company at Coniston, formerly at Victoria Mines. In addition to the nickel and copper which will probably average slightly over 3 per cent nickel, and 2 per cent copper, these ores of the Sudbury district contain small amounts of gold, silver, platinum, and palladium. The present metallurgical practice involves the following processes:—

I. Roasting the ores in open heaps, to remove part of the sulphur.

II. Smelting in water-jacketed blast furnaces, to produce a low grade matte, containing 33 per cent copper-nickel and nearly all the precious metals.

III. Converting the furnace matte in Bessemer basic converters, to make a matte containing about 80 per cent copper-nickel.

IV. Refining the converter matte, separating the nickel, copper, and precious metals.

At the present time the first three processes only are carried on in Canada. The converter matte is shipped to the United States and to England for final treatment.

The total quantity of nickel-copper ore mined during 1913 was 784,697 tons and the quantity smelted 823,403 tons. There were produced 47,150 tons of Bessemer matte, containing 12,938 tons of copper and 24,838 tons of nickel. This is the largest production since the beginning of operations in 1886. In 1912 there were smelted 725,065 tons of ore, from which was produced 41,925 tons of Bessemer matte, containing 11,116 tons of copper and 22,421 tons of nickel.

Statistics of smelter production from these ores since the commencement of this industry are shown in the following table:

Smelter Production of the Nickel-Copper Ores of the Sudbury District.

Calendar Year.	Ore mined.	Ore smelted.	Matte shipped.	Value matte.	Nickel content of matte.	Copper content of matte.
	Tons.	Tons.	Tons.	$	Tons.	Tons.
1886	3,307					
1887	507	30,000				
1888	.....		.....	.....	900	1,500
1889	44,990	40,146	3,274	.....	432	733
1890	.....	.....	.....	.....	718	651
1891	83,300	72,558	10,336	.....	2,018	2,064
1892	74,381	57,022	.....	.....	1,207	1,102
1893			9,425	.....	1,991	1,821
1894	103,223	96,038	11,681	766,422	2,454	2,604
1895	74,135	68,618	10,188	890,834	1,944	2,288
1896	94,960	71,027	10,759	416,594	1,699	1,584
1897	93,154	96,370	13,968	.....	1,909	2,750
1898	123,820	121,924	.....		2,759	4,187
1899	159,957	172,761	.....	702,341	2,872	2,834
1900	196,420		23,336	1,076,306	3,540	3,364
1901	315,692	255,958		1,661,839	4,594	4,318
1902	269,538	211,847	25,311	1,327,448	5,347	3,553
1903	136,033	207,030	13,832	2,686,469	6,253	3,576
1904	203,388	118,470	10,154	2,193,198	5,274	2,455
1905	277,766	251,421	17,405	4,019,814	9,438	4,386
1906	343,814	340,059	20,310	4,628,011	10,745	5,264
1907	351,916	359,076	22,025	3,289,382	10,595	6,996
1908	409,551	360,180	21,210	2,930,989	9,572	7,503
1909	451,892	462,336	25,845	1,913,012	13,141	7,873
1910	652,392	628,947	35,033	5,380,064	18,636	9,630
1911	612,511	610,834	32,607	4,915,593	17,049	8,966
1912	737,726	725,065	41,925	6,303,102	22,421	11,116
1913	784,697	823,403	47,150	7,076,945	24,838	12,938

Silver-Copper-Nickel-Arsenic Ores.—The first shipments of silver ores from the Cobalt district were made in 1904, and in 1906 the first works for the treatment of these ores in Canada were established by the Canadian Copper Company, at Copper Cliff, Ont. This plant was closed down however in 1913 because of the extended treatment of these ores in cyanide plants at the mines. Operations were continued at the plants of the Coniagas Reduction Company, at Thorold, and the Deloro Mining and Reduction Company, at Deloro, Ont., but that of the Canada Refining and Smelting Company, at Orillia, was not operated during 1913. At each of these plants when in operation, nickel and cobalt oxide are recovered in addition to silver bullion and white arsenic. Other smaller plants have been established at Kingston, North Bay, and Welland.

A large proportion of the ore tonnage shipped from the Cobalt district still sent to smelters in the United States, although during the past three years there has been a considerable increase in the treatment of these ores by cyanidation and the recovery of silver at the mine in the form of bullion. Thus we find a further falling off, during 1913, in the recovery of silver at Ontario smelters and an increased amount of bullion produced at the mines.

The treatment of these ores in Ontario smelters during the past four years has given the following results:

		1910	1911.	1912.	1913.
Ore treated	Tons.	9,466	9,330	8,607	6,124
Products recovered—					
Silver produced†	Ozs.	14,574,839	17,753,167	15,675,218	11,356,767
White arsenic	Lbs.	3,003,467	4,194,200	4,090,768	3,384,249
Speiss or residues	Tons.	3,074			
Cobalt oxide	Lbs.				....
Nickel oxide	"	13,508	154,174	340,054	600,079 268,304
Mixed cobalt and nickel oxides and cobalt material	"	108,178	1,260,832	1,285,280	243,737

†Fine ounces contained in silver bullion, fineness ranging from 850 to 998

In his annual report on the mining industry tributary to the Temiskaming and Northern Ontario Railway, Mr. A. A. Cole, has published the following records of production at the three most prominent silver smelters.

Canadian Copper Company.

"In the autumn of 1912 the Canadian Copper Company decided to close up and abandon its Cobalt plant and since that time has accepted no cobalt ores."

"The following statement shows the ore treated and the production of the Cobalt plant of the Canadian Copper Company from the commencement of operations to their close in 1913."

Year.	Ore treated.	Silver fine.	Metallic.		White arsenic.
			Cobalt.	Nickel.	
	Pounds.	Ounces.	Pounds.	Pounds.	Pounds.
1906	1,767,692·5	1,282,692·78	9,021	3,987	
1907	4,560,627·5	3,829,542·82	331,151	138,427	510,622
1908	9,857,072·5	8,551,582·07	464,171	268,140	942,827
1909	10,651,189·5	8,779,014·55	690,737	463,588	1,242,722
1910	9,792,511·0	8,696,624·87	346,483	260,756	843,619
1911	6,744,108·0	6,584,102·46	238,684	234,323	680,074
1912	3,667,301·0	3,523,207·80	223,163	209,330	476,156
1913	186,602·0	47,590·00	15,506	7,161	95,669
	47,227,104·0	41,294,357·35	2,318,916	1,585,712	4,791,689

Coniagas Reduction Company, Thorold, Ont.

"The output of this smelter up to the 31st December, 1913, is as follows:"

Year.	Ores treated.	Silver, fine.	Cobalt, oxide.	Nickel, oxide.	White arsenic.
	Tons.	Ounces.	Tons.	Tons.	Tons.
1908	266·8	360,683	5·5	1·5	13·5
1909	1,116·9	1,659,604	0·9	....	100·0
1910	2,017·25	3,485,243	53·8	13·2	557·7
1911	2,821·50	5,770,271	60·5	17·3	766·1
1912	2,288·77	4,824,632	129·0	50·7	636·7
1913	2,509·8	4,977,012	250·6	115·6	319·4
	11,021·02	21,077,455	500·3	198·3	2,393·4

Deloro Mining and Reduction Company, Ltd., Deloro, Ont.

"In order to increase the output of this company's plant at Deloro and at the same time effect certain economies in production extensive additions are under construction. The principal extensions consist firstly in the installation of a blast furnace of double the capacity of the present one."

"This, in conjunction with an increased capacity in the roasting plant will enable the company to handle from 300 to 400 tons of silver-cobalt ore per month. It is planned to balance the whole plant in proportion to this. Already various changes and additions have been made in the oxide plant which have materially increased the capacity of that section. With further additions which are now going on, the capacity will be still further increased in a comparatively short time, and as this means more work for the silver plant, on account of the increased quantity of revert, etc., the actual capacity of the silver plant for ore will be governed to some extent by the output of the oxide plant, hence the wide range in the smelting capacity quoted above."

"This plant treats both high grade ore and concentrates, as well as a limited quantity of those table concentrates which are highly silicious."

"It is expected to have extensions completed and the plant working to full capacity early in the spring of 1914. Already contracts have been closed covering the entire output of the oxide plant for a year ahead."

Production of Deloro Smelter, 1908 to 31st December, 1913.

	Ore treated.	Silver, fine.	Cobalt and mixed oxides.	Refined arsenic.
	Tons.	Ounces.	Tons.	Tons.
Previous to 1913	11,065	20,339,860	500	3,275
During 1913	2,920	6,350,500	190	893
	13,985	26,690,360	690	4,168

Lead Ores.—Two lead smelting plants were in operation during 1913. The small plant at Kingston, Ontario, built by the North American Smelting Company, and completed in 1912, was operated in 1913, chiefly on British Columbia and imported ores and lead waste. The lead smelter and refinery at Trail, B.C., owned by the Consolidated Mining and Smelting Company, treated practically all the lead ore mined in southern British Columbia with the exception of the small tonnage that went to Kingston.

In the lead refinery at Trail, the bullion from the smelter is cast into anodes and re-deposited electrolytically upon cathode sheets of refined lead. The refined lead is cast into pigs or manufactured into lead pipe. The slimes from the tank room carry gold, silver, antimony, arsenic, and copper.

The first two are recovered as fine metals, and the copper as copper sulphate. Antimony is also recovered, though not regularly, and bearing metal is manufactured.

The annual production of refined lead, fine gold and silver, and copper sulphate has been as follows:—

Calendar Year.	Refined lead.	Fine gold.	Fine silver.	Copper sulphate.
	Lbs.	Ozs.	Ozs.	Lbs.
1904	7,519,440	4,336	551,450	56,000
1905	15,804,509	8,602	1,088,328	77,175
1906	20,471,314	9,993	1,263,809	143,135
1907	26,607,461	10,395	1,631,422	97,751
1908	36,549,274	15,346	1,956,039	203,379
1909	41,883,614	18,241	2,003,003	51,405
1910	32,987,508	13,298	1,798,960	163,228
1911	23,525,050	15,270	1,325,601	197,187
1912	35,254,790	12,118	1,896,999	87,110
1913	36,218,784	11,977	2,433,002	130, 533

"At Trail the principal improvements have been alterations in the machine and blacksmith shops, and the transfer of machinery for these shops from the old Le Roi plant; the re-building of one of the copper furnaces and increasing its length to thirty-five feet; preparation for installation of a new lead furnace, and for re-building the lead furnaces; preparations for the installment of a new blower and of cranes for handling material in the blast furnace building; re-building of the Heberlein plant to reduce costs of operation and to take care of increased tonnage of lead ores; including the installation of a crane for handling the Heberlein pots, and of a 24 x 36 jaw crusher and grab bucket for handling sinter, and the purchase of additional Heberlein pots; the purchase of additional electric locomotives; of two Wedge roasters to take care of increased tonnage of lead ores; the installation of a gas-producer for the Dwight and Lloyd roasters, to replace firing with gasoline."

Gold-Silver-Copper Ores of British Columbia.—Three copper smelters were active in British Columbia during 1913. These were the Trail copper furnace of the Consolidated Mining and Smelting Company, treating the ores of the Rossland camp and other ores of the district; the Grand Forks plant of the Granby Consolidated Mining, Smelting and Power Co., and the Greenwood plant of the British Columbia Copper Company, treating chiefly the low grade ores of the Boundary district.

On the Coast the Tyee Copper Company's furnace at Ladysmith was idle throughout the year. Construction was continued by the Granby Company on their new furnace [illegible] Anyox, Observatory inlet, Portland canal, which was completed and blown in on March 16, 1914.

The aggregate production of British Columbia copper smelters during the past five years including the foreign ores treated, was as follows:

—		1910.	1911.	1912.	1913.
Ore smelted	Tons.	1,987,752	1,517,981	2,212,316	2,119,754
Smelter products—					
Matte	"	11,519	11,320	6,727	5,159
Blister	"	13,918	10,710	17,069	15,270
Metallic content of matte and blister—					
Gold	Ozs.	197,181	175,189	184,815	213,279
Silver	"	636,140	585,896	686,171	934,601
Copper	Lbs.	36,890,283	29,855,868	36,174,185	33,370,176

Trail Smelter.—Statistics of the production of the Trail smelter, including both the copper and lead furnaces, have been published in the annual reports of the Company, the figures since 1896 having been as follows:—

Production of Trail Smelter.

Year ending June 30.	Ore smelted.	Metals contained in matte and bullion produced.			
		Gold.	Silver.	Lead.	Copper.
	Tons.	Ozs.	Ozs.	Lbs.	Lbs.
1906 (6 months only)	157,640	64,590	1,074,255	15,133,683	2,399,161
1907	[illegible]	69,168	1,100,271	20,283,083	3,443,310
1908	[illegible]	121,380	2,224,888	32,157,139	4,004,468
1909	[illegible]	114,920	2,443,475	43,675,077	4,637,631
1910	487,125	137,614	2,162,406	42,368,816	5,974,959
1911	388,785	119,067	1,458,758	24,026,015	4,421,988
1912	296,458	129,789	1,765,992	26,072,074	2,914,141
1913 (15 mos. to Sept. 30, 1913.)	407,124	186,017	3,224,408	48,325,252	3,454,814
Production from 1894 to Sept. 30, 1913	3,551,051	1,332,929	23,449,031	299,295,896	54,244,747

Granby and Anyox Smelters.—The Granby smelter is situated at Grand Forks in the Boundary district, and the Anyox smelter at Observatory inlet, Portland canal; both are owned by the Granby Consolidated Mining, Smelting and Power Company. The ores treated at Grand Forks are those from the Company's mines at Phoenix together with a small tonnage of custom ore; while the Anyox smelter will treat the ores from the Hidden Creek properties.

The smelter at Anyox, which was not blown in until March of 1914, was described in the Engineering and Mining Journal, of January 3, 1914, from which the following extracts have been taken.

"The Hidden Creek reduction works of the Granby Consolidated Mining, Smelting & Power Co., Ltd., is rapidly approaching completion, and early in 1914 is expected to be ready for blowing in on ores from the company's mines nearby, in which some 8,000,000 tons of ore containing more than 20 per cent copper have been developed; and incidentally a much larger tonnage of lower-grade ore. Because of the higher tenor of the Hidden Creek ores, the new works of 2,000 tons daily capacity will produce as much copper as the older plant at Grand Forks, B.C., which smelts more than double this tonnage."

"The works are on Granby Bay, formerly called Goose Bay, an indenture in the western shore of Hastings Arm, which, with Alice Arm, merges into Observatory Inlet."

"The furnaces, of which there are three, are 50 inches wide by 30 feet long, and are the regular type of retangular water-jacketed matting furnace made by the Traylor Engineering & Mfg. Co. The furnaces are provided with 4½ inch tuyerers at 10 inch centers. The slag tap is at the side. The converter room is in one end of the main smelter building, in which are three converter stands. The converters of the Great Falls type are 12 feet in diameter."

"The downtakes from the furnaces, and the flue from the converter hoods, lead into a large dust chamber by the side of the main smelter building. From the center of the chamber the main flue leads up the hill to the reinforced-concrete stack 22 feet in diameter by 153 feet high, the top of which is about 300 feet above the furnaces."

"The Granby Company has secured from the British Columbia government the right to reclaim a large area of ground by filling in a shallow-water area in Granby Bay directly in front of the smelter site with slag. Thus is a convenient dumping ground for the slag obtained, and as the dump grows, the area of the company's new-made land will gradually increase."

"Power will be generated at a hydro-electric plant, on Granby Bay, just below the smelter site. The water of Falls Creek will be impounded by a crib and rock-filled dam, one mile back of the smelter. A 6 foot wooden-stave pipe will convey the water from the reservoir to the Pelton wheels in the power house, at an available head of 400 feet."

"The company will, for the present, secure coke and such coal as is needed, from the Crow's Nest Pass mines, in southwestern Alberta and also from mines near Tacoma, Wash. Limestone for flux will come from a deposit on the Portland Canal, 25 miles below Stewart."

The Phoenix ores are of particular interest because of the low tenor of their metal values, their self-fluxing character, and the large tonnage treated. The percentage of metals contained has been decreasing and the recovery of metals during the year ending June 30, 1913, as shown in the Company's annual report was: copper 17·68 pounds; silver 0·208 ounces and gold 0·0326 ounces per ton of ore smelted.

The first furnace of 300 tons capacity was completed in 1900, and since that date the capacity of the plant has been increased from time to time until at present there are eight furnaces with a total capacity of about 4,500 tons per day. The converter plant was first installed in 1902, and enlarged in 1909.

The quantities of ores smelted and the total production of metals shown in the accompanying table, are compiled from the Company's annual published reports.

The blast furnace department was operated throughout the year and handled:—

Granby ore	1,264,690 tons.
Foreign ore	15,179 "
Converter slag and matte	48,078 "
Flue dust	4,422 "

Average per cent of coke used per ton of ore 13·36.

The tonnage of ore smelted during the year was 1,279,869, as against 739,519 in 1912, and 984,346 in 1911.

The average smelting cost for the year was $1.214, as against $1.256 in 1912.

The converting department produced 22,683,181 lbs. of copper in 1913, as against 13,226,360 lbs. in 1912, and 17,858,860 lbs. in 1911. The converters in 1913 handled 34,500 tons of 32·9 per cent matte.

Ores Smelted and Metals Recovered at Granby Smelter.

Year ending June 30.	All materials smelted.			Metals produced.			
	Granby ore.	Foreign.		Total.	Gold.	Silver.	Copper.
		Ore.	Matte.				
	Tons.	Tons.	Tons.	Tons.	Ozs.	Ozs.	Lbs.
1901	169,087	7,832	......	176,919	8,871	34,990	5,435,955
1902	293,645	4,454	3,001	301,100	30,786	274,511	10,836,851
1903	289,583	7,691	6,223	303,497	35,121	277,574	12,551,758
1904	516,059	36,182	4,290	556,531	54,493	275,935	16,020,986
1905	550,738	39,382	......	590,120	42,980	215,449	14,224,692
1906	796,188	36,158	......	832,346	50,020	316,947	19,939,004
1907	649,022	16,893	......	665,915	32,738	201,337	16,410,576
1908	858,432	24,179	......	882,611	40,068	300,204	21,092,288
1909	964,789	19,944	......	984,733	45,760	335,520	21,901,528
1910	1,175,548	21,829	......	1,197,377	48,752	356,746	22,754,899
1911	959,563	24,783	......	984,346	41,707	343,178	17,858,860
1912	721,719	17,800	......	739,519	33,932	225,305	13,231,121
1913	1,264,690	15,179	......	1,279,869	47,266	324,336	22,688,614
Total	9,209,063	272,306	13,514	9,494,883	512,494	3,482,032	215,947,132

Greenwood Smelter.—The plant of the British Columbia Copper Company, at Greenwood, B.C., includes three large furnaces, having a total daily capacity of from 2,400 to 2,500 tons, and a converter plant.

The last annual published report of the Company covering the year ending December 31, 1913, contains the following references to smelting operations:—

"Six hundred and twelve thousand nine hundred and seven (612,907) tons of ore were treated at the company's smelter, being:

353,422 tons of British Columbia Copper Co.'s ore, and
259,485 tons of custom ore.

"There were produced—

8,296,902 lbs. of fine copper;
137,051·72 ozs. of silver;
26,640·629 ozs. of gold;

the proceeds of which, with miscellaneous earnings, amounted to $1,904,694.52."

"Owing to shortage of ore, the smelter was unable to operate at more than 82 per cent of actual capacity. During a period covering about four months, at two different times, it was attempted to run three furnaces; the balance of the year the two large furnaces were in operation. As against this the individual furnace efficiency was the highest ever attained at this plant. The slags showed lower metal losses than for any previous year."

"Costs were higher for several reasons: shortage of ore; extra labour on coke stock pile, occasioned by various periods of coke shortage; many expensive renewals and repairs to plant and machinery, which were taken up in operation expenses; same overhead expenses as when running full capacity."

General Operating Cost—

"The yield in gold, copper, and silver from the company ores was less than ever before. A comparative table is shown below as against the results for 1912."

——	1912.	1913.
Yield of copper per ton of B.C. Copper Co.'s copper-bearing ores........Lbs.	13,600	12,175
Yield of gold and silver in B.C. Copper Co.'s ores..........................	$0·762	$0·573
Average price realized for copper..	16·664c.	15·071c.
Cost of producing copper from B.C. Copper Co.'s ores, crediting expenditure with gold and silver contents of ore; per lb. of fine copper.............	12·855 c.	17·903c.
Cost per ton of handling ore, including all expenses from 'ore in place' to sale of the contained metals..	$2·4596	$2·8108